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NOTE:—In certain cases it is not possible to check references in the original publication. Such references are marked with an asterisk.

Errata.

Vol. **11**, p. 559. for "II. GORDON, H. McL. (1939).", read "II. GORDON, H. McL., & WHITTEN, L. K. (1939)."

Vol. **12**, p. 262. I. GRIFFITH, A. S. (1941). for "[. . . BROOKE—*V.B.* **9**. 200]", read "[. . . BROOKE—*V.B.* **12**. 200]".

Bulletins on disease subjects written for farmers and "popular" articles of a similar nature are not included in the *Veterinary Bulletin*. Those of a sufficiently important nature, are, however, included in *Index Veterinarius*; so also are certain review articles, presidential addresses, congress proceedings, etc., where the title conveys as much information as could be given in an abstract of a few lines. For information of this nature, readers of the *Veterinary Bulletin* are referred to *Index Veterinarius*, where titles of all publications indexed by the bureau are fully cross-referenced.

A list of annotations and reviews, classified according to subject, is now given in *Index Veterinarius*, being inserted at the end of each number. Such papers will not necessarily be dealt with in the *Veterinary Bulletin*.

Review on "Antibacterial Agents derived from Micro-Organisms"

Reprints of this review may be obtained from: Central Sales Branch (Imperial Agricultural Bureaux), Agricultural Research Building, Penglais, Aberystwyth. Price 1/- each.

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THE

VETERINARY BULLETIN

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DISEASES CAUSED BY BACTERIA AND FUNGI

POUNDEN, W. D., & ZEHNER, C. E. (1941). **An Irritant for Udder Tissues Produced by Mastitis Streptococci in Milk.**—*Cornell Vet.* **31.** 382–388.

Aseptically collected milk was incubated with *Str. agalactiae* at 37°C., to give a mixture of curds and whey after two days. The intramammary injection into four cows of this whey, whether or not sterilized by boiling, produced marked inflammatory reactions. Most of the secretions then obtained from the udders were comparable to those obtained from naturally occurring cases of acute streptococcal mastitis. It is considered that the *in vivo* action of the streptococcus may parallel its *in vitro* action, and that a local intramammary reduction of pH may be instrumental in the production of mastitis.

—E. COTCHIN.

*GRUNDMANN, H. (1940). Die Feststellung der Alkalireserve bei der Mastitis des Rindes. **[The Alkali Reserve in Bovine Mastitis].**—*Inaug. Diss., Hanover.* [Abst. from abst. in *Dtsch. tierärztl. Wschr.* **49.** 75].

Five cases of mastitis showed low alkaline reserve (plasma bicarbonate), returning to normal during convalescence. The average value shown by 14 clinically healthy cows was 61·1 vol.%, and that of 21 with mastitis 11·5 vol.% below this. Eight cows also showing disturbance of general health averaged 5·8 vol.% below the average of 18 cows without such disturbance.

[The German abstract does not give sufficient detail to estimate the statistical significance of the data, and other causes of variation in alkaline reserve are not discussed.]—H. H. GREEN.

SEELEMANN, M. (1941). Biologische Untersuchungen an von Pferden stammenden Streptokokken. **[Biological Research on Streptococci Isolated from Horses].**—*Z. Veterinärk.* **53.** 97–113.

This is an interesting contribution to the classification of streptococci of equine origin. Arranging the organisms isolated according to the Lancefield grouping, they may be divided into three main groups, *viz*, (a) *Str. equi* (group C), (b) *Str. pyogenes animalis* (formerly recognized as *Str. pyogenes equi*), and (c) streptococci belonging to group D, embracing the enterococci, and frequently called *Str. abortus-equi*. *Str. equi* may be regularly isolated from the pus of horses affected with strangles, while *Str. pyogenes animalis* is present in the nasal secretion in catarrhal conditions of the mucous membrane. In similar conditions, as well as in certain cases of fistulous withers, the third variety (group D) may be isolated.

S. raises various questions for solution, such as the individual role of the organism in causing specific infection in horses, the communicability of *Str. equi* to man, and the possible role of *Str. lactis* and of pneumococci in septic conditions of the horse.—S. J. EDWARDS.

STAFSETH, H. J., & CLINTON, I. (1941). **Lancefield Group E Streptococci in Cervical Abscesses of Swine.**—*J. Amer. vet. med. Ass.* **99.** 468–470.

In the submaxillary and parotid regions of the head of a seven-month-old pig, half-a-dozen abscesses, about the size of a walnut and filled with a thick, creamy, greenish pus, were found P.M. From three of these, pure cultures of a Lancefield group E streptococcus were obtained. It was considered unlikely that the infection could be traced to milk, but it is suggested that it arose from careless technique when the pig was inoculated against hog cholera.—E. COTCHIN.

SHERMAN, J. M., GREISEN, E. C., & NIVEN, C. F., Jr. (1941). **Variability in Streptococci of Group B.**—*J. infect. Dis.* **69.** 271–277.

Lancefield's group B is a fairly homogeneous group, physiologically and serologically, of streptococci of human and bovine origin. With respect, however, to certain properties, especially haemolytic power and ability to ferment lactose and salicin, it is known that strains giving diverse reactions do occur. An attempt has been made by the authors to determine whether or not group B streptococci are truly variable with regard to these characteristics. From experiments in which pure cultures were plated, and thousands of resultant daughter colonies examined, as well as from observations made intermittently over a number of years on stock cultures, the authors present carefully assessed evidence in favour of true variability within this range of characters, although most of the cultures proved remarkably stable. Non-haemolytic strains were obtained from originally haemolytic cultures, but not *vice versa*. In respect to fermentation of lactose and salicin, negative strains were isolated from positive cultures, and positive strains from negative cultures.

The authors record that nine cultures of bovine origin, which originally fermented lactose during three years of culture, lost this property within five years.

—E. COTCHIN.

HAMMON, W. McD. (1941). **Staphylococcus Enterotoxin: An Improved Cat Test, Chemical and Immunological Studies.**—*Amer. J. publ. Hlth.* **31.** 1191–1198.

Staphylococcus enterotoxin, injected intravenously into

large kittens or adult cats, produces vomiting within 15 min. to two hours. A maximum temperature of 104°–106°F. is reached in 2–4 hours, preceded by rigors. Diarrhoea nearly always occurs, and usually persists for several hours. Vomiting may recur at intervals of 5–60 min. over a period of 2–3 hours. The animal is noticeably less ill 3–4 hours after the onset of symptoms, and if allowed plenty of water, will be apparently normal after 48 hours. The vomiting is the specific symptom. No animal is used for the test more than three times, and a result is not concluded to be negative unless repeated in at least two previously unused cats. The test has been found to be highly specific for culture enterotoxin, and has been used in studies of the properties of the toxin. From these it is concluded that the toxin molecule is large ; the toxin is heat-stable (100°C. for 20–30 min.) ; it is resistant to acids or alkalis over a pH range of 4·5–8·2 ; it is not digested by trypsin or pepsin ; it is insoluble in alcohol, chloroform, or ether, and is not precipitated by 75% saturation with ammonium sulphate. No evidence of antigenic power was found. The toxin is thus probably a complex carbohydrate.—E. COTCHIN.

SCHAAF, J. (1941). Milzbrand bei Dachsen, Marden und Frettchen. **[Anthrax in Badgers, Martens, and Ferrets].**—*Tierärztl. Rdsch.* **47.** 514–515.

Anthrax-infected horseflesh was inadvertently fed to many animals in a zoo. The following died of acute anthrax :– one of four pine martens, two of four beech martens, four of five ferrets, and both of two badgers. Various other carnivores, mostly Felidae and Canidae, were unaffected, as were carnivorous birds and seven brown bears fed with the meat after it had been cooked.
—J. G. CARR.

GRAHAM-SMITH, G. S. (1941). **Further Observations on the Longevity of Dry Spores of *B. anthracis*.**—*J. Hyg., Camb.* **41.** 496.

Pieces of canvas inoculated with spores of *Bacillus anthracis*, were kept at room temperature in sterile sealed envelopes for 34 years. After this period *B. anthracis* could not be recovered by cultural means.
—K. C. SELLERS.

HAILER, E., & HEICKEN, K. (1941). Untersuchungen zur Bekämpfung des gewerblichen Milzbrandes. I. Mitteilung. Die keimtötende Wirkung von Salz- und von Schwefelsäure ohne und mit Zusatz von Kochsalz auf Milzbrandsporen bei verschiedenen Temperaturen. **[The Control of Industrial Anthrax. I. Lethal Action of HCl and H_2SO_4 with and without NaCl on Anthrax Spores at Different Temperatures].**—*Z. Hyg. InfektKr.* **123.** 177–194. [Abst. from authors' summary].

The tests were made with 2% HCl and 2% H_2SO_4, with or without 3, 10, or 20% NaCl at 4, 12, or 20°C. HCl proved to be 9–10 times more rapidly lethal than H_2SO_4. The addition of NaCl in either concentration accelerated the disinfectant action, whilst relative cold had a marked slowing effect, killing time at 4°C. being 5-6 times longer than at 20°C.

RESHETNYAK, V. Z. (1940). K etiologii gnoĭnoĭ bronkhopnevmonii zherebyat. **[Aetiology of Suppurative Broncho-Pneumonia in Foals].**—*Sovyet. Vet.* No. 1. pp. 20–24.

An epizootic of suppurative broncho-pneumonia in foals, due to *Corynebacterium*, is described. In one stud, 25% of the foals were affected, deaths occurring in 22·5% of these. The condition occurred mostly in two-month-old foals, particularly in those born in late spring or in summer. P.M. examinations were made in 37 cases ; *Corynebact. equi* was isolated in pure culture in 27 cases, mixed cultures being obtained in the remainder. The strain of *C. equi* isolated was, however, pathogenic for rabbits, white mice, and to some extent for g. pigs, causing death after 30–36 hours.

The infection was experimentally transmitted to foals *per os* and *via* the respiratory tract.—A. MOLDAWSKY.

MCKAY, W. M. (1941). **Tuberculous Enteritis and Gastritis in Bovines.**—*Vet. Rec.* **53.** 743–745.

Details of the history and autopsy findings are given of one case of tuberculous ulceration of the stomach, one case of congenital tuberculous enteritis, and one case of healed extensive tuberculous enteritis, in cattle. Since tuberculous enteritis was found on autopsy in 21 of 100 consecutive cases of TB. in cattle, and since cattle with TB. of the lungs may swallow infective sputum, it is stressed that, for practical purposes, the faeces are a major means of spreading infection among housed cattle.—E. COTCHIN.

POYNTON, J. O. (1939). **A Preliminary Note on the Tuberculosis Problem in the Federated Malay States.**—*Bull. Inst. med. Res. F.M.S.* No. 3. pp. 88.

A general account of TB. in human beings in Malaya. It is stated that at the time of writing bovine TB. was of no importance in Malaya.

BERG, W. N. (1941). **Guinea Pig Inoculation and Culture. Disagreement between the Two Methods Due to Random Sampling.**—*Amer. Rev. Tuberc.* **44.** 757–764.

B. discusses the possible sources of error and of disagreement in the culture of tubercle bacilli and the test dosing of g. pigs. By the use of statistical methods, he has evolved a laboratory technique which, he claims, will diminish these anomalies.—K. C. SELLERS.

PRYCE, D. M. (1941). **Sputum Film Cultures of Tubercle Bacilli : a Method for the Early Observation of Growth.**—*J. Path. Bact.* **53.** 327–334.

Films of tuberculous sputum, pus, or caseous material are dried on glass, treated with sulphuric acid to destroy contaminants, and incubated in contact with a suitable culture medium. Some of the tubercle bacilli present develop in the course of a few days into micro-colonies, which may be stained by the Ziehl-Neelsen method, and are then easily visible under the low power microscope.

Two methods are described in detail, citrated blood haemolysed by saponin being used as culture medium ; in the first, the smears are made on the inside bottom surface of a petri dish ; in the second, they are made on glass slides, and the culture medium is contained in a ring of bakelite or other suitable material applied to the slide. The appearance of typical growths is described, and the application of the method for academic and diagnostic purposes is discussed.—E. COTCHIN.

GON, K. (1939). **The Spleen and Tuberculosis. II. The Influence of the Spleen on the Biology of Tuberculous Rabbits and Human Beings. A. The Blood Picture of the Tuberculous Rabbit.**—*J. Chosen med. Ass.* **29.** 1222-1249. [In Japanese : abst. from German summary p. 81 of European absts.]

In intact and splenectomized rabbits experimentally infected with TB., the erythrocyte count and the haemoglobin content of the blood were reduced. Oral or parenteral administration of spleen hormone decreased the erythrocyte count and haemoglobin content to even lower levels in splenectomized rabbits. There was no notable change in the leucocyte count but the ratio of lymphocytes to polymorphonuclear leucocytes was lowered in splenectomized rabbits and increased in intact animals. The monocyte count was increased in both sets of animals. Administration of spleen hormone to splenectomized rabbits altered the blood picture to

that of intact rabbits. Spleen hormone did not emphasize the changes due to TB. in the blood picture of intact rabbits.—A. M. COPPING.

CRUICKSHANK, D. B. (1940). **The Natural Occurrence of Zinc in Teeth. III. Variations in Tuberculosis.**—*Brit. dent. J.* **68.** 257–271. [Abst. in *Brit. Chem. Physol. Abstr.* A., III. p. 18. (1941), copied *verbatim.* Signed : H. H. K.]

Zn was determined in teeth of 22 healthy and 19 tuberculous subjects. Increased Zn was found in dental tissues in tuberculosis. The degree of increase varies with the tissue, being, on the average, 7% for dentine and 17% for enamel ; it varies with the tooth, being greatest for the molars, and falling off towards the anterior teeth, the incisors being lowest. The average Zn content of normal "dried" dentine is 178 ± 21, that of normal enamel 152 ± 27 mg. per kg.

GRIFFITH, A. S. (1941). **The History of Six Old Cultures of** *Mycobacterium tuberculosis.*—*J. Hyg., Camb.* **41.** 530–542.

Six strains of tubercle bacilli were submitted to the usual tests to distinguish the mammalian types from each other and from the avian type. These strains, isolated originally from mammals, including man, cows, and horses, were stated to have lost their virulence completely. On egg medium five of the strains gave a readily emulsifiable, slimy growth characteristic of the avian type ; the sixth strain, although readily emulsifiable, grew as a human eugonic type. Microscopical examination of smears from young primary colonies on plain egg, showed that all six strains were pleomorphic, exhibiting streptothrix, bulbous, and branched forms typical of the avian bacillus. None of the strains was pathogenic for g. pigs or fowls. In rabbits infected intravenously, lesions attributable to the strains were confined to the joints, bursae, tendon sheaths, and bones ; this is a distribution typical of avian infection in the rabbit. Mammalian cultures were recovered from two of the rabbits ; one, from a rabbit infected with the Calmette-Raw strain, was a human type, and the other from a rabbited infected with the Gladys-Lyon strain, a bovine type. Neither type, however, raised the rabbits' resistance to spontaneous infection with mammalian tubercle bacilli. With the exception of the Spahlinger-Gloyne strain, all strains completely absorbed agglutinins from avian sera.

These comprehensive tests strongly indicated that the strains were of the avian type, but G. was not prepared to admit that a true modification had occurred and inclined to the view that these changes might have been accidental.—K. C. SELLERS.

AMBRUS, J., & VÁLYI-NAGY, T. (1940). BCG bacillusokból előállított, sensibilizáló hatású rész. **[Insoluble Sensitizing Substance Produced by BCG Bacilli].**—*Mag. orv. Arch.* **41.** 29–53. [Abst. in *Brit. Chem. Physiol. Abstrs.* A., III. p. 54. (1941), copied *verbatim.* Signed : A. G. P.]

After removal of fats and of water- and NaOH-sol. proteins an insol. sensitising substance is obtained from the bacilli. Rabbits treated with this substance show increased sensitivity to Koch's bacillus. After repeated intravenous injection of the substance it was possible to produce fatal anaphylactic shock.

WATANABE, M., & NAKAMURA, N. (1941). **On the Susceptibility of the Rabbit to Artificial Infection of the Glanders Bacilli. I. Bacteriological and Post-Mortem Observations.**—*Jap. J. vet. Sci.* **3.** 309–336. [In Japanese : abst. from English summary].

The susceptibility of the rabbit to various inoculations of glanders bacilli is demonstrated. Intravenous or intraperitoneal injection of about 2 mg. of virulent culture causes nodule formation in the lungs, liver, spleen, nasal septum, testes, or epididymis and occasionally in the suprarenal body in three days and on the ears in 6–7 days.—D. D. OGILVIE.

BLANK, L. C. (1941). **Erysipelas of Swine. Erysipelas Culture Proving to be a Valuable Prophylactic Agent in Southwestern Iowa.**—*N. Amer. Vet.* **22.** 735–739.

A preliminary account of the promising results of a field trial of the serum-culture method of immunization in infected herds. The culture is prepared to a standard set by the U.S. Bureau of Animal Industry, and its use is strictly controlled. A table of the dosages used is given, and the results obtained in three herds are recorded.—E. COTCHIN.

SLABOSPITS'KII, T. P. (1938). Pro novii mikroorganizm, vidilenii vid porosyat. **[New Micro-Organism Isolated from Piglets].**—*Nauk. Zap. Kiev. vet. Inst.* **1.** 39–49. [Russian summary]. Kiev : Ukrainian State Publishing Office.

A new Gram-positive, motile organism was isolated from piglets showing a clinical picture similar to that observed in swine pox. The organism was pathogenic for white mice and rabbits, affecting the haemopoietic system and provoking the appearance in the blood of megaloblasts, and an increase of monocytes and neutrophiles. From the morphological, cultural, and biological properties, S. suggests that the organism be classified as a new species, *Listerella suis.*—A. M.

SCHMIDT, H. W. (1941). Die Bedeutung der Tularämie in Europa heute. **[Tularaemia in Europe Today].**—*Tierärztl. Rdsch.* **47.** 489–492.

A general review of tularaemia, its occurrence in Europe, and its bacteriology and clinical characters. The disease caused some alarm about 1928, but it has become rare in recent years.—A. CUCKA.

WITTE, J. (1941). Glatt- und Rauhformen des Bacterium pyosepticum viscosum. **[Smooth and Rough Forms of** *Bact. equirulis*].—*Z. InfektKr. Haustiere.* **57.** 297–301.

From the organs of a foal which died 24 hours after birth, pure cultures of *Bact. equirulis* were obtained. These cultures were peculiar in that both S and R colonies were present. The cultural and biochemical reactions of each form were similar.—J. G. CARR.

WILLIAMS, S. (1941). **An Outbreak of Infection Due to Streptobacillus moniliformis among Wild Mice.**—*Med. J. Aust.* March 22nd. 357–359.

This outbreak occurred during a mouse plague in New South Wales, from 1–90% of mice being said to be affected in different areas. Chronic joint abscesses were the main lesions and there was general wasting. Pure cultures of *Str. moniliformis* (*Asterococcus muris*) were obtained from the abscesses and the disease could be reproduced with these. There was no evidence of the infection occurring in man.—W. I. B. BEVERIDGE.

MAHAFFEY, L. W. (1941). **Diffuse Suppurative Pyelo-Nephritis in a Sheep.**—*Aust. vet. J.* **17.** 109–110.

A 12-month-old wether showed listlessness and inappetence, and urine dribbled from the prepuce. At autopsy both kidneys were swollen and had many pale nodular areas consisting of necrotic tissue and pus. Histologically there were found degenerative changes in almost all the tissue of the kidneys and pus formation in many places including glomeruli. A pure culture of *Bacterium coli* was isolated.—W. I. B. BEVERIDGE.

MAGRASSI, F., GALLIE, F., & SCALFI, L. (1940). Isolierung eines pathogenen Ultravirus aus Kaninchen, welche mit Filtraten virulenter (das Vi-Antigen

enthaltender) Typhusbazillen geimpft wurden. **[Isolation of a Pathogenic Ultravirus from Rabbits Inoculated with Typhoid Vi-Antigen]**.—*Arch. ges. Virusforsch.* **1.** 324–349.

It is known that a culture of typhoid bacilli may vary greatly in its virulence. One of the factors in this variation is the so-called Vi-antigen but in view of the known relationship between phage (virus) and bacteria, experiments were carried out in an attempt to demonstrate a virus.

A sterile filtrate was prepared from a suspension of typhoid bacilli rich in Vi-antigen. This filtrate was inoculated into rabbits by various routes. It produced toxic symptoms with loss of weight and diarrhoea in the first 24 hours, but most animals recovered. Pyrexia usually developed 2–10 days later accompanied by anorexia and severe diarrhoea which was usually followed by death. Passage experiments, using suspensions of bacteriologically sterile tissues and occasionally actual filtrates, were successful. During the disease there was a great increase in the number of intestinal bacteria and the normally sterile duodenum and ileum contained large numbers of coliform bacilli. The sera of 40% of the rabbits used in passage experiments agglutinated typhoid bacilli to a high titre.

The possibility is considered that a "latent" virus was stimulated, but attempts to carry out similar passage experiments following the inoculation of normal rabbit tissues or cultures of *Bacterium coli* were not successful. Uninoculated rabbits in the experimental room remained healthy, and pathogenic material produced no disease when inoculated into mice, g. pigs, and a monkey (*Macacus rhesus*).—JOHN FRANCIS.

STITZ, B., & GRÖKEL, L. (1941). Ein Beitrag zur Paratyphusinfektion des Pferdes unter besonderer Berücksichtigung von Bact. paratyphus abortus equi—Befunden bei Wallachen und Hengsten. **[Salmonella Infection in Horses. *S. abortus-equi* in Geldings and Stallions]**.—*Z. Veterinärk.* **53.** 215–231.

A serological and bacteriological survey was carried out of *S. abortus-equi* in the horses at a large military hospital.

Of 237,687 animals tested, 766, including 499 mares, had a blood agglutination titre of over 1 : 800 for this organism. The majority also reacted, although at a lower titre, to *S. typhi-murium*. The curve of the agglutination titre was found to fluctuate considerably within a comparatively short time; it is therefore recommended that a second test should always be made after an interval of 3–4 weeks before an animal may be considered as a non-reactor.

S. abortus-equi was isolated from various organs of 128 animals which had died from a variety of conditions, but in most cases its presence could not be correlated with the clinical picture or lesions. The authors consider that, except when it is present in the genital tract, the organism can be regarded as a secondary invader and as non-pathogenic. Special attention was paid to the methods of spread of infection, and faeces, urine, and uterine discharges were examined. The organism was present in two of 408 samples of faeces, eight of 398 samples of urine, and 19 of 67 samples of uterine discharge. Some of the carrier animals were geldings, which indicates that both sexes play a part in disseminating the disease. The fact that the organism was present in the intestines of a number of non-reactors to the agglutination test suggests that *S. abortus-equi* may live a saprophytic existence in this situation.—N. S. BARRON.

FUKANO, K. (1941). **Studies on the Abortion Salmonellosis Among Horses. II. Experimental Cases of the Abortion Salmonellosis.**—*Jap. J. vet. Sci.* **3.** 135–153. [In Japanese: abst. from English summary]. [For part I, see *V. B.* **11.** 670].

Artificial infection of 11 young uncastrated ponies, reared in a locality free from equine infectious anaemia, with fairly large amounts of a virulent strain of *S. abortus-equi* by various routes, produced the symptoms characteristic of natural cases of abortion salmonellosis, described by F. as pyrexia in the earlier and remittent fever in the later stages, conjunctival discoloration, arthritis, tumefaction of the withers and testicles with suppuration, and leucocytosis. Two ponies, which had recovered from experimental infection and three, which had cohabited with experimentally infected ponies, were infected with the virus of E.I.A. One of the former group and all of the latter, with the onset of E.I.A., showed the same complicated clinical symptoms as are seen in natural cases of mixed infection with the two diseases.—R. O. MUIR.

TURKEVICH, K. I., TERESHCHENKO, A. Y., & CHOLOVSKII, A. A. (1938). Dosvid laboratornoï diagnostiki paratifoznikh zakhvoryuvan' telyat, sprichinyuvanikh Salm. enteritidis (B. enteritidis Gärtner'a). **[Bacteriological Diagnosis of *Salmonella enteritidis* Infection in Calves]**.—*Nauk. Zap. Kiev. vet. Inst.* **1.** 74–88. Kiev: Ukrainian State Publishing Office. [Russian summary].

The authors stress the importance of early diagnosis of *S. enteritidis* infection in calves by means of blood culture, the agglutination test and examination of faeces. The best results from blood cultivation are obtained 4–7 days after infection, during the febrile reaction.
—A. MOLDAWSKY.

PONOMARENKO, F. M., & SADCHIKOV, Y. I. (1938). Pro rol' piogennoï mikroflori v histogenezi pnevmoniï u paratifoznikh telyat. **[Role of Pyogenic Organisms in the Aetiology of Pneumonia in Calves Infected with Salmonella]**.—*Nauk. Zap. Kiev. vet. Inst.* **1.** 31–38. Kiev: Ukrainian State Publishing Office. [Russian summary].

From their examination of 24 calf carcasses the authors conclude that the lesions present in the lungs in calf pneumonia are due to a typical, catarrhal, purulent broncho-pneumonia and not to a "croupous" pneumonia as has often been indicated by other workers. They assert that the primary cause of the condition is not salmonella but various pyogenic bacteria, the most important of these being *Corynebacterium pyogenes*.
—A. MOLDAWSKY.

STEWART, D. F., & HAYSTON, J. T. (1941). **Salmonella dublin Infection in Calves.**—*Aust. vet. J.* **17.** 102–104.

The authors isolated a strain of *Salmonella* from an outbreak of dysentery in calves. Antiserum was prepared and appropriate agglutinin-absorption tests were carried out which showed the organism to be *S. enteritidis* var. *dublin*.—W. I. B. BEVERIDGE.

BEZDENEZHNYKH, F. I. (1939). K voprosu o patologo-anatomicheskikh izmeneniyakh v selezenke i pecheni pri paratife porosyat. **[Pathological Changes in the Spleen and Liver in Piglets with Paratyphoid]**.—*Trud. Kirov. zootech.-vet. Inst.* **3.** No. 12. 61–65.

P.M. examination was made of 13 piglets, up to two months old, from farms on which paratyphoid had been shown to be present. The macro- and microscopic lesions in the liver and spleen varied with the intensity of the necrotic enteritis present. In pronounced cases there was congestion together with subcapsular petechial haemorrhages and occasionally haemorrhagic infarcts; hyperplasia of the reticulo-endothelial system of the spleen was also observed. In all cases in the spleen,

and in three cases in the liver, megakaryocytes in clumps, chains, or singly were observed, as many as 50 per sq. mm. being present in spleens of acute cases. The appearance of megalocytes is probably due to the presence of tissue detritus which gives rise to their increased formation in the spleen and bone marrow —A. MOLDAWSKY.

BENEDICT, R. G., MCCOY, E., & WISNICKY, W. (1941). **Salmonella Types in Silver Foxes.**—*J. infect. Dis.* **69.** 167–172.

Routine autopsies were carried out on 286 " consignments " of silver foxes and of these 149 were diagnosed as cases of distemper and 28 as fox paratyphoid. In all, 156 salmonella cultures were isolated and of these 35 were selected for identification.

The following species of *Salmonella* which have previously been reported from silver foxes were again identified :– *typhi-murium*, *cholerae-suis*, *cholerae-suis* var. *kunzendorf*, *newington*, *enteritidis* var. *danysz*, and *enteritidis* var. *dublin*. In addition *S. pullorum* and *S. newport* were encountered for the first time in foxes. *S. typhi-murium* and *S. cholerae-suis* var. *kunzendorf* were the types most commonly met with and were recovered from both distemper and paratyphoid cases. *S. pullorum* was found only in fox paratyphoid and *S. newport* only in distemper. No salmonella organisms were recovered from 48 foxes injected with live canine distemper virus ; but on the other hand secondary organisms were frequently found in foxes from fur ranges, which had been slaughtered on the appearance of distemper symptoms. The differentiation of distemper and paratyphoid, especially in chronic cases, is extremely difficult.

Salmonella variants, the so-called " paracolons ", were recovered from a large number of foxes, and some were antigenically related to *S. typhi-murium*.—R. F. G.

*SARACENO, S. (1941). **[Salmonella Organisms in Meat].**—*Clin. vet., Milano.* **64.** 14–18. [Abst. from abst. in *Wien. tierärztl. Mschr.* **28.** 553].

A record with case history notes on 28 cases of salmonella infection in meat examined at Milan. Twenty-two samples were of porcine origin (15 " *S. suipestifer* " and 7 " *S. s. voldagsen* "), four were from calves (*S. enteritidis*), one from a horse (*S. typhi-murium*), and one from sausage meat (*S. enteritidis*). The case history of the horse is given : it was considered that the animal was affected primarily with equine infectious anaemia and that the salmonella infection was secondary.

EDWARDS, P. R., & BRUNER, D. W. (1941). **A New Salmonella Type,** *Salmonella illinois*.—*Proc. Soc. exp. Biol., N.Y.* **48.** 240–242.

The new salmonella type described, *S. illinois*, is represented by seven cultures isolated from three outbreaks of animal disease, one in pigs, one in partridges, and one in turkeys. No other micro-organism was found associated with the salmonella in any of the animals. Serological examination indicated that the organisms belonged to group E of the Kauffmann-White classification. Alcohol-treated suspensions were agglutinated by all sera containing agglutinins for antigen III. It was found that *S. illinois* contained only a portion of antigen III and of antigen XV ; in addition it contained a strong somatic factor peculiar to itself. Examination of the flagellar antigens revealed that the organism was diphasic. " The antigenic formula is (III), (XV), (XXXIV) : Z_{10} : 1,5. . . . "—R. ALLCROFT.

HOHN, J., & HERRMANN, W. (1939). Die epidemiologische Bedeutung der Typen des Breslau-Bakteriums. **[Epidemiological Significance of the Types of** *Salmonella typhi-murium*].—*Z. Hyg. InfektKr.* **122.** 227–237.

In 1937 the authors described four types of *S. typhi-murium* identified by fermentation of various carbohydrates, *viz*, glucose, arabinose, rhamnose, and dulcite. They claimed that type 3, which does not ferment rhamnose or dulcite and has only a very slow action on the other carbohydrates, has its reservoir in ducks and is the only one of the four types of epidemiological significance in man. Brief descriptions of eight further outbreaks of food poisoning due to this type are given. In one case 150 persons were affected after eating meringue prepared from duck eggs imported from Holland. Of ten strains of salmonella isolated from this batch of eggs, seven were rhamnose-negative *S. typhi-murium* and three were *S. enteritidis*. Strains of *S. typhi-murium* from g. pigs are also rhamnose negative, but they can be distinguished from type 3 by their action on the other carbohydrates.

There is a general discussion of the antigenic structure of the organism and it is stated that serological methods cannot be used to distinguish the four types recognizable by fermentation tests.—E. G. WHITE.

JANSEN, J. (1941). Ueber die beim Meerschweinchen vorkommenden Kulturtypen von Salmonella typhi murium. **[The Type of** *S. typhi-murium* **Occurring in G. Pigs].**—*Z. Hyg. InfektKr.* **123.** 218–219.

From a g. pig dead of acute paratyphoid in a breeding colony an ammonia-weak (so called pigeon type) strain of *S. typhi-murium* was isolated.—J. E.

JANSEN, J. (1941). Der Kulturtyp von Salmonella typhi murium (Breslau) beim Papagei. **[The Type of** *S. typhi-murium* **Occurring in a Parrot].**—*Z. Hyg. InfektKr.* **123.** 220.

A rhamnose-negative (duck type) strain of *S. typhi-murium* was isolated from a dead parrot (*Psittacus erithacus*) from a zoological collection.—J. E.

BRUNER, D. W., & EDWARDS, P. R. (1941). **The Demonstration of Non-Specific Components in Salmonella Paratyphi A by Induced Variation.**—*J. Bact.* **42.** 467–478.

Three induced phases were obtained in 16 strains of *S. paratyphi-A* by successive subculture in tubes of semi-solid agar, with the addition of sufficient agglutinating serum to immobilize the bacilli, until the induced phase was pure according to serological reactions. In many instances, combinations of sera were used to direct variation as desired or to revert induced phases to the original phase, and O or H agglutinins which might interfere with migration were removed by absorption with appropriate bacilli. One phase was closely related to the nonspecific phases of diphasic types while the other two were quite unlike the normal salmonella antigens. Study of the nonspecific components isolated from 12 cultures showed a closer relationship to the nonspecific phase of the Sendai type than to the other nonspecific phases. The induced phases were stable under ordinary cultural conditions and could be reverted only by the addition of appropriate sera to the culture medium. The isolation of these nonspecific antigens was regarded as additional evidence that monophasic types are derived from multiphasic types through suppression of types.—R. O. MUIR.

SEELEMANN, M., & LANGELOH, L. (1941). Untersuchungen über das Verhalten von Kälbern und Jungtieren gegenüber der Bruzellainfektion. **[Behaviour of Calves Towards Brucella Infection].**—*Tierärztl. Rdsch.* **47.** 450–455.

Groups of calves were blood tested at various ages. It was found that calves born of negatively reacting cows,

but fed on infected milk, were commonly negative; only 5·5% reacted positively, and then for a few months only. 50% of calves born of reacting cows reacted (to Meinicke's flocculation test but not to the agglutination test), but by the seventh month all were negative. It was thus confirmed that calves do not contract a lasting infection from infected cows. Calves from infected herds can therefore be freely used as breeding stock in clean herds, provided that they are negative reactors. It is suggested that the site of infection in young calves is the mesenteric lymph nodes, where the infection is soon destroyed.—A. Cucka.

*Tettenborn, G. (1940). Ueber das Vorkommen von Abortus-Bang-Antikörpern im Blut von Schafen. [*Brucella abortus* **Antibodies in the Blood of Sheep**]. —*Inaug. Diss., Hanover.* [Abst. from abst. in *Tierärtzl. Rdsch.* **47.** 532].

T. tested 1,790 sheep on 18 farms containing brucella-infected cattle, using the agglutination and Meinicke's reactions. Positive results were obtained at one farm only, in sheep previously weakened by infection with *Salmonella abortus-ovis* and by foot and mouth disease. No cases of abortion in ewes due to brucella infection were verified.

Bergfeld, A. (1941). Beitrag zur Pathogenese der künstlichen Banginfektion der Meerschweinchen. [**Pathogenesis of Experimental** *Brucella abortus* **Infection in G. Pigs**].—*Arch. wiss. prakt. Tierheilk.* **76.** 287–314.

From observations on about 40 g. pigs, B. concludes that, although death does not occur, the general health of the g. pig is considerably affected by the injection of *Br. abortus*, especially when the reticulo-endothelial system is damaged by the injection of "electro-colloidal" copper solution. A marked monocytosis accompanied by a lympho- and leucopenia occurs within the first ten days, and to a greater degree if the r.e.s. is blockaded. Agglutinins appear in the serum within seven days and in blockaded g. pigs within six days. There is swelling of the local lymph nodes and spleen often accompanied by liver lesions. Epithelioid cells appear during the second week, especially in the Malpighian corpuscles of the spleen, and later in the liver and lnn.: these cells occur earlier and to a more marked degree in blockaded g. pigs.—A. W. S.

Stearns, T. W., & Roepke, M. H. (1941). **Electrophoresis Studies on Brucella.**—*J. Bact.* **42.** 411–430.

Electrophoretic measurements on 11 strains of brucella indicate that their mobilities remain constant during long periods of cultivation. Storage in the cold of suspensions in saline with or without 0·2% formol causes no change in mobility up to four months, but with 0·5% phenol a decrease in mobility occurs after two weeks. S strains of brucella show no change in mobility over the pH range 3·75–6·75, whereas R strains tend to show an increase in mobility with pH. At low pH values some irreversible changes occur in the cell surface. S strains of bovine, porcine, and caprine types were found to have the same electrophoretic mobilities.—R. A. Kekwick.

Brocard, H. (1940). Production, chez le cobaye, de phlegmons gazeux mortels par l'injection simultanée d'adrénaline et de cultures de Bacillus perfringens avirulent. [**Production of Gas Gangrene by the Simultaneous Injection of Adrenalin and Avirulent** *Clostridium welchii*].—*C. R. Soc. Biol. Paris.* **134.** 567–569.

For his experiments B. used an avirulent strain of *Cl. perfringens* [*Cl. welchii*], obtained by blood culture from a transient *post-abortum* bacteraemia. When injected alone into g. pigs, intramuscularly or intracardially, this strain produced no effect, even in massive doses. When 0·5 ml. of culture was injected intramuscularly along with 1 ml. of a 1 : 10,000 solution of adrenalin, it produced typical gas gangrene at the site of inoculation, with a rapidly fatal septicaemia. The adrenalin injected alone caused no reaction or only a slight infiltration of the area.

The virulence of the culture was not raised by passage through g. pigs.—Isobel W. Burton.

*Rökke, B. (1941). [**Gas Oedema in Domestic Animals in Norway**].—*Norsk VetTidsskr.* **53.** 1–23 and 49–68. [Abst. from abst. in *Wien. tierärztl. Mschr.* **28.** 555].

A review of anaerobic infections of domestic animals in Norway. Bradsot of sheep is the commonest, in association with *Clostridium septique* or *Cl. welchii*. Blackleg and malignant oedema are occasionally seen in cattle and one case of *Cl. chauvoei* infection in a horse is recorded.

Gunsalus, I. C., Salisbury, G. W., & Willett, E. L. (1941). **The Bacteriology of Bull Semen.**—*J. Dairy Sci.* **24.** 911–919.

The bacterial count of 43 ejaculates collected from 19 bulls by means of an artificial vagina ranged from 1,000–22,000,000 per ml. The predominating organisms were *Pseudomonas pyocyanea*, *Bacterium coli*, staphylococci, and diphtheroids. It was found that by douching the sheath and washing the underline, if the bull was dirty, the number of bacteria in semen could be markedly reduced. The addition of egg-yolk-phosphate diluent to semen can contribute greatly to the bacterial count, unless fresh eggs from healthy hens are used and the diluent is prepared by aseptic methods. Bacterial growth during storage was held at the minimum by storing at 5°C. or lower. No evidence was obtained that semen possesses any germicidal action. It was found that the motility of spermatozoa in samples of semen inoculated with *Bact. coli* and stored for varying periods at 5°C. and 7°C. was markedly superior to that of uninoculated semen when diluted with SGC-2 diluent.—N. J. S.

Robinow, C. F. (1942). **A Study of the Nuclear Apparatus of Bacteria.**—*Proc. roy. Soc.* Ser. B. **130.** 299–324.

A study was made of the nuclear structure of two strains of *Bacillus mycoides* with special reference to resting and germinating spores. In resting spores a chromatinic, dumbbell-shaped body was seen closely attached to a rod of protoplasm and, in a few spores, division of this body could be seen. During the early stages of germination, the chromatinic body entered the protoplasm where it could not be demonstrated until a later stage of germination. It was then seen to have divided into two dumbbell forms. Further division of these bodies preceded the normal division of the vegetative cell. Similar structures were demonstrated in the cells of *Proteus vulgaris* and in two strains of *Sarcina*. R. concludes that the dumbbell bodies are comparable to the chromosomes of plant and animal cells.—K. C. Sellers.

Baker, Z., Harrison, R. W., & Miller, B. F. (1941). **Action of Synthetic Detergents on the Metabolism of Bacteria.**—*J. exp. Med.* **73.** 249–271.

Studies were made of the effects of certain commercial synthetic detergents and wetting agents upon respiration and glycolysis of Gram-positive and Gram-negative bacteria. All the cationic detergents studied (*i.e.* those whose action depends upon the nature of the cation) effectively inhibited bacterial metabolism at a concentration of 1 : 3,000, and some were equally active at 1 : 30,000. Both Gram-positive and Gram-negative organisms were equally sensitive to this class of deter-

gent. Few of the anionic detergents inhibited bacterial metabolism as effectively as the cationic detergents, but all of the anionic detergents studied were selectively inhibitory to Gram-positive bacteria.

The inhibitory action of both classes was markedly affected by pH ; cationic detergents exhibited maximum activity at an alkaline pH and the anionic ones on the acid side. In studies on homologous series of straight chain alkyl sulphates and sulphoacetates (C_8 to C_{18}) maximum inhibition was exerted by the C_{12}, C_{14}, and C_{16} compounds (lauryl, myristyl and cetyl).

Three lauryl esters of amino acids were found to be powerful inhibitors of bacterial metabolism, and the present results indicate that other cationic detergents can exert an inhibitory activity comparable to quaternary ammonium compounds. Certain detergents, most frequently those of the anionic type, were found to stimulate bacterial metabolism in concentrations lower than those necessary to inhibit growth.—ALFRED EDEN.

SWIFT, H. F. (1941). **Capacity of Pleuropneumonia-Like Microorganisms to Grow on Chorioallantoic Membranes.**—*J. exp. Med.* **74.** 557–568.

Eight strains of pleuro-pneumonia-like organisms, representing four immunological types, were shown to grow on the chorio-allantoic membrane of chick embryos 11–12 days old. None of these strains tested was lethal for the embryo, but better growth was observed in those embryos which had been killed by freezing before inoculation. In this respect the organisms resemble bacteria rather than filtrable viruses. No characteristic lesion, resulting from infection, was observed.—K. C. S.

MORCOS, Z. (1941). **Epizootic Lymphangitis.**—*Vet. J.* **97.** 275–278.

Two cases of epizootic lymphangitis in horses in Cairo are described. Fresh smears from the ulcers showed characteristic double-contoured cells. Diagnosis in both cases was confirmed by intraperitoneal injection of ulcer scrapings or pus into rabbits, and the demonstration 40 days later of hypoplasia of the abdominal lymph nodes, and the presence of numerous organisms.—D. D. O.

GAUGER, H. C. (1941). *Aspergillus Fumigatus* **Infection in Adult Chickens.**—*Poult. Sci.* **20.** 445–446.

A. fumigatus was isolated from three of a flock of 2,300 adult chickens, 10% of which had developed respiratory symptoms resembling infectious laryngotracheitis. Attempts at transmission were unsuccessful.—F. D. A.

HIPPEN. (1941). Trichophytia crustosa et profunda enzootica. [**Crusty and Deep Trichophytosis in Horses**].—*Dtsch. tierärztl. Wschr.* **49.** 438–439.

This disease broke out suddenly among captured horses sent from Belgium and France to a hospital in Germany. Swellings and plaques up to the size of a 5-mark piece appeared on the shoulders, back, and croup and two days afterwards oozing serum formed into hard scales which remained firmly attached for many days until healing had taken place underneath. The disease spread to nine attendants and was diagnosed in them as *Trichophyton* ringworm. Differential diagnosis in the horses from urticaria (allergy) and contagious acne is discussed.

Various methods of treatment were tried, the best being complete washing with derrisol or 7% chloramin with softening and removal of the mature scales by " parachlorol soap ". The most severe cases took eight weeks to clear up.—J. E.

DISEASES CAUSED BY PROTOZOAN PARASITES

*REICHENOW, E. (1940). Ostafrikanische Beobachtungen an Trypanosomiden. [**Observations on Trypanosomidae in East Africa**].—*Arch. Protistenk.* **94.** 267–287. [Abst. from abst. in *Zbl. Bakt. I.* (*Ref.*). **139.** 482].

In the blood of an ox, which was found during rinderpest immunization to be heavily infected with *T. theileri*, numerous dividing forms were present. The process of division observed, an unequal binary fission, is described.

*BARBONI, E. (1940). Ricerche anatomo e istopatologiche su animali da esperimento inoculati con Trichomonas foetus Riedmüller 1928, per via endoperitoneale. [**Histopathology of Experimental Intraperitoneal *T. foetus* Infection**].—*Riv. Parassit.* **4.** 189–206. [Abst. from abst. in *Zbl. Bakt. I.* (*Ref.*). **139.** 483].

G. pigs, dogs, mice, and rabbits succumb to intraperitoneal infection with *T. foetus*. The P.M. finding, apart from a fibrinous, purulent peritonitis, is often a comparable pleurisy with large polynuclear cells (resembling the cells of Nicolau & Lwow, induced by foreign bodies). The vascular changes are characterized by hyperaemia, oedema, and haemorrhage. Cloudy swelling and fatty degeneration occur, frequently together in the myocardium, liver, and kidneys ; there is necrobiosis of the adrenals and calcification of the renal epithelial cells in g. pigs. Inflammatory foci exist, especially in dogs and mice, in liver, kidneys, myocardium, spleen, lymph nodes, and lungs, and in dogs also in the pancreas.

I. CHRISTENSEN, J. F. (1941). **Experimental Production of Coccidiosis in Silage-Fed Feeder Lambs, with Observations on Oocyst Discharge.**—*N. Amer. Vet.* **22.** 606–610.

II. MATHESON, D. C. (1941). **Remarks on the Diagnosis of Coccidiosis.**—*Vet. Rec.* **53.** 647–649.

I. The view has been expressed that clinical coccidiosis may be due to the lowered resistance of the host from unspecified causes to the parasites which normally inhabit its intestine. The experiment undertaken by C. was designed to discover whether outbreaks of coccidiosis could be produced under experimental conditions in small groups of lambs fed exclusively on maize silage, and to clarify the problem as to whether the ingestion of sporulated oocysts is essential for the development of the disease in feed-lots. Two small groups of lambs were maintained in adjacent pens and were provided with more than adequate supplies of silage. One group received for the first two days silage artificially infected with 600,000 sporulated oocysts. The silage fed subsequently to this group, as well as to the other group throughout the experiment, was only naturally, not artificially, infected. The results of the experiment appear to indicate that the severity of an outbreak of coccidiosis under these circumstances is roughly proportional to the numbers of viable oocysts fed during the early part of the feeding period. The similarities between the two groups in time of development of clinical coccidiosis and periods of greatest oocyst production suggest that clinical infection in the naturally infected lambs was the outcome of their ingesting oocysts during the first few days of feeding.

II. M. considers various aspects of coccidiosis from the point of view of the physiology, morphology, and pathology of the organisms. As the paper is obviously intended to assist practitioners in the correct diagnosis of coccidiosis, M. has wisely emphasized the importance of detailed observation [perhaps in too great detail for the practitioner who may not have the time or facilities

for a routine study of coccidia] of the various phases of the life-cycle before an accurate diagnosis can be made.
—C. Horton Smith.

Dickinson, E. M. (1941). **The Effects of Variable Dosages of Sporulated *Eimeria Acervulina* Oocysts on Chickens.**—*Poult. Sci.* **20.** 413–424.

The investigation was planned to demonstrate the effects of different doses of sporulated oocysts on such matters as body weight, egg production, symptoms, and mortality in susceptible chickens of different ages. The dosages are considered in terms of subclinical, clinical, or lethal effects and of the consequences to susceptible chickens of continued feeding of sporulated oocysts. The degree of infection in susceptible birds depends on the number of mature oocysts in a single dose. Infection was found to cause loss in weight and in egg production, but no permanent detrimental effect was observed after 50 daily doses of 500,000 mature oocysts. The resistance resulting from mild dosages of 500 oocysts for ten days was found to be as solid as the protection gained from much heavier daily administrations. [Although the figures afford some guide to dosage they take no account of dead oocysts or of those which may pass through the intestine unhatched.] In no case was coccidiosis regarded as the primary cause of mortality, but D. points out that severe coccidial infection in a susceptible bird may produce abnormal reproductive activity which results in death.—C. Horton Smith.

I. Waxler, S. H. (1941). **The Effect of Feeding Concentrated Physiological Saline to Chickens during Cecal Coccidiosis.**—*Trans. Amer. micr. Soc.* **60.** 453–460.

II. Waxler, S. H. (1941). **Changes Occurring in the Blood and Tissue of Chickens during Coccidiosis and Artificial Haemorrhage.**—*Amer. J. Physiol.* **134.** 19–26.

I. As there is considerable loss of blood during the haemorrhagic phase of caecal coccidiosis, the experiments described were made to determine the effect of feeding physiological saline during the period of profuse bleeding, *i.e.* from the 4th–7th days after infection. Changes in the blood sugar value were used as a measure of the disease and as an indicator of the effect of treatment. The blood sugar level, which increases during this condition, could be reduced by feeding 2 ml. concentrated saline daily during the haemorrhagic phase of the disease. The saline was prepared by grinding 79 physiological saline pills in 96 ml. water forming almost a paste. Although the feeding of salt in quantity is dangerous, it was used here in an attempt to understand blood sugar changes. A single feed of saline was found to cause a definite drop in the blood sugar, and an increase in weight due to increased water consumption was observed. The feeding of salt solution somewhat reduced the rate of mortality, which was three times greater in the untreated birds.

II. The blood of chickens infected with caecal coccidiosis shows a very definite increase in blood sugar as soon as internal haemorrhage occurs as a result of the disease. The blood sugar value rises with increase of haemorrhage until the seventh day when the disease has run its course. The present experiments were made to examine the relationships of sugar and chloride and the changes resulting from coccidiosis. Four aspects were considered :– (1) blood chlorides were determined before and during the disease, (2) sugar and chloride determinations were made after artificial haemorrhage and were then compared with those of bleeding as a result of coccidiosis, (3) the chloride values resulting from artificial bleeding were observed after gum acacia solutions had been injected to replace the volume of blood lost, and (4) determinations of tissue chloride were made in normal and infected animals. Results show that blood chloride increased on the sixth and seventh days of caecal coccidiosis, while blood sugar rose on the fifth day as a consequence of the disease. The increases in blood sugar and chloride were similar in artificial haemorrhage. A 6% NaCl-free gum acacia solution maintained the chloride content of the blood at the normal level after artificial bleeding. The rise in blood chloride during coccidiosis may be accounted for when the decrease in tissue chloride is considered.
—C. Horton Smith.

Baldwin, F. M., Wiswell, O. B., & Jankiewicz, H. A. (1941). **Hemorrhage Control in *Eimeria tenella* Infected Chicks when Protected by Anti-Hemorrhagic Factor, Vitamin K.**—*Proc. Soc. exp. Biol., N.Y.* **48.** 278–280.

The data given in this preliminary report indicate that administration of vitamin K to chicks infected with *E. tenella* decreases the mortality. One of the birds died in the group of ten which received a supplement of vitamin K as compared with seven in an equal number which had no K supplement. The droppings of the vitamin K group were much less bloody than those of the control infected group, and autopsies showed that the vitamin K group had a fibrinated core in the caeca, which was in the process of being resorbed.
—R. Allcroft.

Waxler, S. H. (1941). **Immunization against Cecal Coccidiosis in Chickens by the Use of X-Ray-Attenuated Oocysts.**—*J. Amer. vet. med. Ass.* **99.** 481–485.

As there appears to be a progressive decrease in haemoglobin with an increase in severity of caecal coccidiosis of chickens, haemoglobin determinations were adopted as the criteria for judging the severity of the disease. Irradiated oocysts showed a decrease in virulence, or an attenuation, over untreated controls and this attenuation increased with increase of X-ray exposure. The severity of the infection, as shown by haemoglobin determination, also decreased. Standardized irradiated suspensions, when fed to birds, enable them to resist subsequent heavy reinfections to much the same degree as chickens which survive severe infections resulting from the feeding of normal cultures.—C. H. S.

I. Trager, W. (1941). **The Effect of Intraperitoneal Injections of Carbon Ink on the Course of *Plasmodium lophurae* Infections in Chickens.**—*Amer. J. Hyg.* Sect. C. **34.** 141–149.

II. Laird, R. L. (1941). **Observations on Mosquito Transmission of *Plasmodium lophurae*.**—*Ibid.* 163–167.

III. Trager, W. (1941). **Studies on Conditions Affecting the Survival in vitro of a Malarial Parasite (*Plasmodium lophurae*).**—*J. exp. Med.* **74.** 441–462.

I. Age immunity to *P. lophurae* exists among older chickens. Various treatments have failed to establish susceptibility to infection in older chickens. A sterile 15% by volume dilution of India ink in distilled water, with sodium chloride added to give a concentration of 0·85%, was injected into the right ventral portion of the pelvic cavity of birds 4–9 weeks old at a rate of 5 ml. per 100 g. body weight. The birds received injections one day previous to and several days following inoculation with the malaria parasites. These birds were found to be as susceptible to infection as very young chickens.

II. Wild mosquitoes which were collected in the larval stage, identified and bred out, formed laboratory colonies. The duck functioned as the vertebrate host. *Culex pipiens, C. restuans, Aëdes atropalpus, A. aegypti,*

and *A. albopictus* [from established laboratory colonies] were the species used. *C. restuans*, *A. atropalpus*, and *A. albopictus* were found to be susceptible to *P. lophurae*, as they all developed sporozoites in the salivary glands, but failure to infect followed attempts with *A. aegypti* and *C. pipiens*. Transmission of *P. lophurae* through *A. albopictus* was effected, but heavily infected mosquitoes with apparently fully developed sporozoites in the salivary glands did not always succeed in infecting a susceptible animal. Ducks which had been infected with *P. lophurae* and had recovered proved to have an immunity to subsequent infections.

III. The possibilities of cultivating malarial parasites *in vitro* have hardly been explored and there has been little agreement as to the simplest conditions favouring parasite survival *in vitro*. The principal aim of the present investigation is concerned with the comparative effects of various agents and conditions on survival at temperatures of 39·5°–42°C. which would be expected to favour development or rapid death of the organisms. The best criterion of survival is the infectivity test, which, in an extensive series of experiments, requires abundant and easily obtained experimental animals and for this reason *P. lophurae*, which can infect chickens, was selected. The strain was maintained by passages made every six days in young birds. The experiments were made on the vertebrate stages of the parasite. The protozoan was found to survive within the above-mentioned temperature limits in a balanced salt solution of high potassium content. Aeration, without a high oxygen tension, was necessary. Other important provisions were found to be frequent changes of medium and an optimal population density per cu. mm. Survival is favoured by concentrated erythrocyte extract, optimal concentrations of plasma or serum, of chick embryo extract, of glucose, etc. The evidence obtained showed that parasites surviving *in vitro* continued to develop, especially through the first few days.—C. H. S.

ADLER, S., & TCHERNOMORETZ, I. (1941). **Continued Passage of Extra-Erythrocytic Forms of *Plasmodium gallinaceum* in the Absence of Erythrocytic Schizogony.**—*Ann. trop. Med. Parasit.* **35.** 241–246.

The authors produced in fowls pure infections with extra-erythrocytic forms of *P. gallinaceum* which could be maintained for at least five passages without the occurrence of pigmented erythrocytic forms. In birds (aged 12–18 months) receiving daily doses of 150 mg. per kg. body weight of quinine hydrochloride, the constant production of extra-erythrocytic forms only was observed during ten passages by blood inoculation over a period of 21 months after primary infection by *Stegomyia fasciata*. Small non-pigmented trophozoites, derived from the extra-erythrocytic schizonts, were found in the red blood cells of most of these birds; these trophozoites developed into pigmented forms on cessation of quinine hydrochloride treatment for one day, or on reduction of dosage. It became clear that when daily maximal doses of the drug were administered within a day of the injection of extra-erythrocytic forms, complete elimination of erythrocytic schizogony and stimulation of extra-erythrocytic multiplication occurred. During this process merozoites were formed which invaded the erythrocytes but which did not change into pigmented parasites unless there was a cessation or reduction of quininization.—C. HORTON SMITH.

BROOKE, M. M. (1942). **Inoculation of Canaries with Sporozoites from Isolated Malarial Oocysts.**—*Amer. J. Hyg.* **35.** 134–137.

It is not definitely known whether sporozoites obtained from the stomach oocysts or free in the body cavity of the mosquito are infective. The aim of the present study was to obtain strains of avian plasmodia by the inoculation of canaries with sporozoites from isolated oocysts and, in connexion with this, methods are described for the isolation of stomach oocysts from the sporozoites lying free in the body cavity. No malarial infections were produced when sporozoites from seven isolated oocysts were inoculated intravenously and subcutaneously into clean canaries, indicating that sporozoites within the stomach oocysts are not infective when artificially introduced into the vertebrate host.—C. HORTON SMITH.

I. MORRISON, D. B., & ANDERSON, W. A. D. (1942). **The Pigment of the Malaria Parasite.**—*Publ. Hlth Rep., Wash.* **57.** 90–94.

II. MORRISON, D. B., & ANDERSON, W. A. D. (1942). **On the Role of Parasite Pigment in the Malaria Paroxysm.**—*Ibid.* 161–174.

[Authors' summaries copied *verbatim*].

I. Malaria parasites (*Plasmodium knowlesi*) contain a pigment which yields hemin crystals and reduced pyridine hemochromogen. When the pigment is extracted from the parasites under conditions which do not affect the spectral characteristics of hemoglobin, it is identifiable spectrophotometrically as ferrihemic acid (hematin).

II. There are important differences between the symptoms of ferrihemate intoxication and malaria infection in the monkey. Ferrihemate-injected monkeys die in shock with the exhibition of symptoms suggestive of capillary blocking in vital organs, or recover very rapidly and completely after a brief interval of acute toxic reaction. Ferrihemate is not a causative agent in the malaria paroxysm of monkeys since the pigment is not liberated in soluble form from the parasite.

PRIGOR, M. I. (1940). Chetyrekhletniĭ opyt bor'by s piroplazmozom loshadeĭ v raïone. **[Four Years' Work in the Control of Equine Piroplasmosis].**—*Sovyet. Vet.* No. 2–3. pp. 25–28.

A description of the organization, and the hygienic and chemoprophylactic measures undertaken in the course of four years in a seaside Steppe district comprising 23 inhabited localities (horse population 7,100), in seven of which (containing 1,420 horses), cases of piroplasmosis had occurred.

It is stated that, as a result of tick destruction and mass administration of trypan blue, the number of cases was reduced from 104 in 1934 to 35 in 1935, to 24 in 1936, and to nine in 1937, the number of horses in the district being unchanged.—E. MARTIN.

SCHENDEL, S. A. (1941). **Anaplasmosis in Cattle Following Dehorning.**—*Vet. Med.* **36.** 527–528.

Anaplasmosis has been diagnosed in at least 24 states of the U.S.A. and has become prevalent in the Middle West. Thirty-seven days after 219 steers had been dehorned, the herd was found to be infected with anaplasmosis; four animals had already died and eight were sick. The morbidity increased and when 78 animals had fallen sick it was decided to treat the whole herd with intramuscular injections of sodium cacodylate. Improvement was noted but no drug has yet been found that modifies the course of the disease with any degree of certainty.—S. J. GILBERT.

HOWELL, D. E., STILES, G. W., & MOE, L. H. (1941). **The Transmission of Anaplasmosis by Mosquitoes (Culicidae).**—*J. Amer. vet. med. Ass.* **99.** 107–110.

Evidence is given of the successful experimental transmission of anaplasmosis by culicid mosquitoes. Positive results were obtained only when blood was taken from clinically affected animals. It is probable that large

numbers of mosquitoes are required to effect transmission and that conditions must be favourable. Because of their large size, close association with cattle, and presence in huge numbers, mosquitoes of the genus *Psorophora* are the most probable vectors.—S. J. G.

*Babudieri, B. (1940). Agglutinine per leptospire nel siero di cani di Milano. **[Agglutinins for Leptospira in the Sera of Dogs of Milan].**—*R.C. Ist. Sanit. pubbl. Roma.* **3.** 675–677. [Abst. from abst. in *Zbl. Bakt. I. (Ref.).* **139.** 301].

B. demonstrated antibodies against *L. icterohaemorrhagiae* and *L. bataviae* in the sera of a few dogs in Milan. Negative results were obtained in tests for other leptospira and for the canine type CH of the Dutch East Indies.

*Acquavita Coppola, M., & de Lorenzo, F. (1940). Ricerche sulle Leptospirosi. III. Studio biologico su alcuni reperti di Leptospire. IV. Alterazioni istologiche nella leptospirosi icterohaemorrhagiae sperimentale. **[Research on Leptospirosis. III. Biological Studies. IV. Histological Changes in Experimental Leptospirosis].**—*Arch. ital. Sci. med. colon.* **21.** 208–216 and 385–405. [Abst. from abst. in *Zbl. Bakt. I. (Ref.).* **139.** 299].

III. In the two previous parts, the authors gave results of serological tests on canal workers and on rats in the harbour of Naples. In the present paper they state that leptospira were isolated from 20% of rats giving a positive agglutination reaction. Leptospira were also present in 10% of rats giving a negative aggln. reaction, as was shown by inoculation of organ suspension into g. pigs, of which 10% developed icterohaemorrhagic symptoms. Organisms could not be recovered by culture in Reiter's medium of the rat organs, but were recoverable from five out of eight of those inoculated g. pigs which showed symptoms. Dark-ground examination for leptospira of urine and blood of the infected g. pigs gave negative results. Inoculation into g. pigs of organs of apparently normal rats from cellars and sewers of Naples showed 16% to be infected. Two of the five strains isolated were examined further and found to belong to *L. icterohaemorrhagiae.*

IV. Organ changes were examined histologically in g. pigs which had been infected either with virulent leptospira culture or with organ suspension of infected rats. In the former case all the organs, and in the latter only the liver, kidneys, adrenals, and lungs, were examined. Twenty photomicrographs illustrate the findings. The liver is seen to be completely infiltrated with the organisms, which sometimes appear to be actually within the cytoplasm of the cells. Organisms are numerous in the kidneys also, less numerous in the lungs, and very rare in the adrenals. Haemorrhagic lesions were observed primarily in the lungs, then in the adrenals, and least in the kidneys and liver. Degenerative changes were especially advanced in the kidneys, producing a desquamative nephrosis with cylindrical casts in the urine. Degeneration was also strongly marked in the liver, nodular and diffuse forms being distinguishable. The nodular form affected the epithelial cells, which underwent necrosis. In a few animals inflammatory changes were also seen, which were, however, of less importance than the other described changes. Foci of endocarditis were seen in the heart.

DISEASES CAUSED BY VIRUSES AND RICKETTSIA

Toussieng, E. (1941). Mund- og Klovesygesmitstoffets Natur. **[The Nature of the Infective Agent of Foot and Mouth Disease].**—*Skand. VetTidskr.* **31.** 15–28. [English summary].

A review of the literature, with special reference to the work of Janssen [*V. B.* **11.** 362]. T. concludes, also from his own experience, that F. & M. disease virus is a lifeless substance.—J. E.

*Fogedby, E., & Koefoed, H. (1940). Undersøgelser over den mest effektive Udnyttelse af Virus til Fremstilling af Mund- og Klovesyge-Vaccine. **[The Most Effective Utilization of Virus for the Preparation of Foot and Mouth Disease Vaccine].**—*Maanedsskr. Dyrlaeg.* **52.** 474. [Abst. from abst. in *Skand. VetTidskr.* **31.** 29].

An account of immunization trials on g. pigs with Danish aluminium hydroxide vaccine. Five series of animals were used, varied amounts and concentrations of vaccine being given to them. It was shown that above a certain low dose limit of efficacy, there was a disadvantage in giving large doses of vaccine. Relatively small doses conferred a higher degree of immunity. —J. E.

*Petragnani, G. (1940). **[Further Tests on Dried Salt Virus as a Vaccine against Foot and Mouth Disease].**—*Clin. vet., Milano.* **63.** 245–247. [Abst. from abst. in *Wien. tierärztl. Mschr.* **28.** 270].

Two adult cattle, two young cattle, and two calves were vaccinated twice at an interval of 11 days with dried vaccine previously described [see *V. B.* **11.** 294.], and were infected with test virus 34 days later. Three of the animals reacted with a light oral form of the disease and the others not at all, whilst some controls contracted a virulent infection. It is stated that the dry vaccine is applied in suspension in 3½% sago mucilage and that glucose has been used instead of salt in the preparation of the dried virus.

I. Steffan, H. (1941). Das klinische Bild des ansteckenden Katarrhs der Luftwege des Pferdes. **[The Clinical Picture of Infectious Respiratory Catarrh of the Horse].**—*Z. Veterinärk.* **53.** 71–88.

II. Beller, K., & Traub, E. (1941). Stand und Aussichten der Erforschung des ansteckenden Katarrhs der Luftwege beim Pferd. **[The Position and Outlook in Research on Infectious Respiratory Catarrh of the Horse].**—*Ibid.* 88–97.

III. Rexroth, E. (1941). Beitrag zum klinischen und pathologisch-anatomischen Bild des ansteckenden Katarrhs der Luftwege (nach Beobachtungen bei der Truppe). **[Clinical Features and Pathology of Infectious Respiratory Catarrh of the Horse].**—*Ibid.* 371–390.

IV. Traub, E. (1941). Ansteckender Katarrh der Luftwege im Pferdebestande einer Veterinärkompanie. **[Infectious Respiratory Catarrh in the Horses of a Veterinary Company].**—*Dtsch. tierärztl. Wschr.* **49.** 439–444.

I. A detailed account of the objective symptoms of infectious respiratory catarrh [I.R.C.], compiled from examination of 55 army horses of all ages from three years upwards. S. differentiates four stages. The early stage is little else than a fever with slight coryza, conjunctivitis, and cough; it is curable before it passes into the established stage, which develops into a bronchitis and which may or may not become a bronchopneumonia. Unless this clears up in a reasonable time the so-called "late stage" with chronic bronchitis and various signs of secondary infections supervenes. The fourth phase is a stage of "late injury", characterized

by chronic heart disease, oedema, pulmonary emphysema, local paralysis, etc.

The main symptoms of I.R.C. as it develops are moderate to rather high fever, sero-mucous nasal discharge, conjunctivitis (or perhaps cyanosis or slight icterus), a cough of varied character, and abnormal pulse, respiration and appetite in keeping with the fever and inflammation of the respiratory tract. Results of electrocardiogram tests are given : they showed a marked abnormality indicating conductivity disturbance in the heart.

II. The authors studied the natural disease in 21 healthy horses which were placed in contact for one night with affected horses, and were then isolated and kept under observation. After eight days they contracted fever and nasal catarrh, which in two of them, removed to improved isolation, cleared up without complication in seven days. The rest were left not as strictly segregated and some of them contracted broncho-pneumonia (= Brussels disease, or the fully developed respiratory catarrh with complications). It is concluded that the disease has an early mild form, presumably caused by a virus alone, and an advanced form due to secondary infection of the respiratory tract by β-haemolytic streptococci, which are usually to be demonstrated in the nasal discharge of established cases.

To test this theory, three healthy horses were infected by rubbing into the nostrils nasal discharge filtrate from cases of I.R.C. The animals remained well, but two others treated in the same way with less delay contracted fever after seven days and showed anorexia, submaxillary swelling, and sero-mucous nasal discharge which did not contain streptococci. There was also no laryngitis, which the authors state distinguishes the disease from Hoppegarten cough [a confusing statement—see note below]. In general this experimental disease clinically resembled influenza. Attempts failed to isolate a filtrable virus in tissue culture or by passage to cattle, pigs, ferrets, and mice.

After recovery within a week the above two horses were infected intranasally with nasal excretion containing haemolytic streptococci from established cases of I.R.C. and no illness resulted. The conclusion was that the horses were immune, or that the streptococci without virus were present and were incapable of causing disease.

Finally the horses were placed in contact with established cases of I.R.C. and contracted it, though after a prolonged incubation period of 14 and 18 days, which may have been due to partial immunity from the virus infection.

The work of Eberbeck [*V. B.* **11.** 39.] is discussed and it is suggested that strangles and I.R.C. may be partly similar in origin (? virus infection) and that they differ because they are associated with different types of streptococci possessing different tissue affinity.

III. R. describes his observations on respiratory disease in two groups of German army horses, mustered at high-lying home depots. There was an outbreak lasting from February to May in the first group and one lasting from December to May in the other. In the former a disease first diagnosed as strangles or I.R.C. occurred and was complicated by the appearance of Brussels disease (broncho-pneumonia) which killed 20% of all the horses (72% of those developing Brussels disease). The symptoms included conjunctivitis, fairly high fever, anaemia, broncho-pneumonia usually developing on the left side, cough, arrhythmia of the heart in about 10% of cases, skin exanthema around the perineum, and in odd cases nervous disorder. Haematological and clinical tests showed that the disease bore some resemblance to equine infectious anaemia. Urine analyses showed evidence of kidney disease, and glomerulonephritis was a common finding in some cases which were examined histologically. In this respect R. refers to similar findings by Eberbeck [*V. B.* **12.** 39]. The assumption is that I.R.C. is often accompanied or complicated by nephritis, probably as a result of the toxic action of streptococci causing the lung complications and exanthema. The latter was sometimes followed, after healing, by white spots on the skin, particularly around the nostrils and perineum [simulating dourine], which became pigmented again after some weeks.

P.M. examination of horses showed the presence of necrotic broncho-pneumonia, accompanied in descending order of frequency by nephritis, purpura, petechiae on the visible mucosae, oedema, blood in faeces, colic, and cellulitis in a hind leg.

The second outbreak affected 60% of the horses, which were seen by R. some months later, when many cases of paralysis were occurring among them as late complications. Glomerulonephritis was a feature in these horses.

In the treatment of I.R.C., the best results followed the use of "thoromangan", an iodine-thorium-manganese compound.

IV. A description of a disease which spread to almost half of the horses of a veterinary company stationed at the foot of the Pyrenees, during the early autumn of 1940. It was regarded by the local French veterinarian as a form of *typho-anémie* (equine infectious anaemia). T. investigated the condition.

The first thing noticed in the horses was the development of a papular or pustular exanthema around the nostrils and lips, but nowhere else. It lasted for only a week and cleared up without its nature (? pox) being determined. The lesions were followed by depigmented spots as in the cases described in III. Some of the affected horses were feverish and the impression was formed that the exanthema and the fever were not connected.

An outbreak of respiratory disease then developed with the following chief symptoms :– fever, nasal discharge, conjunctivitis, cough, oedema, and swelling of submaxillary lymph nodes without abscessation. Pneumonia only supervened in three cases. The fever was often intermittent and recalled E.I.A., as did also the state of the blood ; urine analysis revealed albuminuria during the febrile periods. The mortality rate was 10%, due to purulent pneumonia or heart failure during acute fever. Attempts were made to isolate bacteria but in only two cases did this succeed, β-haemolytic streptococci being recovered.

To test for the presence of E.I.A. virus two healthy horses were inoculated with blood from sick horses, but they failed to react in a positive sense. T. concludes that the outbreak was one of I.R.C.

[It appears that the relationship of *Ansteckender Katarrh der Luftwege* to equine "pink eye" is not clear. It appears further that *Ansteckender Katarrh der Luftwege* replaces the term *Infektiöse Bronchitis* or *Hoppegartener Husten* in German literature—see *V. B.* **5.** 268, 419 and 624, and **11.** 762.]—J. E.

*Gratzl. (1940). Beobachtungen über die ansteckende Bronchopneumonie (Brüsseler Krankheit). [**Observations on Equine Infectious Broncho-pneumonia**].—*Z. Veterinärk.* **52.** 145–161. [Abst. from abst. in *Zbl. Bakt. I.* (*Ref.*). **139.** 330].

Two weeks after the appearance of infectious respiratory catarrh and strangles at a base hospital for horses, an outbreak of acute broncho-pneumonia supervened, resembling what was known as "Brussels disease" during the war of 1914–18. Within six months 92 horses became affected and 27 died. The principal P.M. feature was catarrhal broncho-pneumonia and

severe degeneration of the parenchymatous organs. During the same period 75 horses contracted *Brustseuche* [contagious pneumonia or influenza pectoralis], but only one died as a result.

G. compares Brussels disease and *Brustseuche* in a table [not given in the abstract].

MAGNUSSON, H. (1939). Le coryza gangreneux (fièvre catarrhale maligne). Quelques tentatives de transmission expérimentale. **[Bovine Malignant Catarrh. Some Attempts at Experimental Transmission].**—*Bull. Off. internat. Epiz.* **18.** 213–236. Discussion pp. 470–474.

M. describes his experiments and discusses the results obtained by other workers. Malignant catarrh is a serious disease in the Scandinavian countries, the mortality being almost 100%. The disease is similar to snotsiekte which occurs in South Africa, and it exists in other parts of the world. Artificial transmission is not easy, but it is now generally concluded that the intravenous inoculation of large quantities of virulent blood is the most reliable means of producing the disease, the incubation period varying from 4–50 days. Positive results have been obtained following the inoculation of lymphatic and brain tissue, but inoculation of bodily secretions or excretions has never been followed by infection. DAUBNEY & HUDSON [*V. B.* **7.** 21.] transmitted the disease to rabbits and back again to cattle. One worker claims to have produced the disease in sheep and goats, but others have failed to produce infection in horses, sheep, dogs, and birds.

There is little doubt that in Africa the gnu is latently infected with the virus and transmits it to cattle in an unknown way. There is considerable experimental and epidemiological evidence that sheep play a similar role in Europe, but outbreaks do occur in which there is no evidence of contact with sheep. Cattle which ultimately contract the disease may be in contact with sheep for a long period before they become affected, and M. brings forward evidence to emphasize the great importance of bad hygienic and nutritional conditions in precipitating an attack of the disease.

In the discussion GILLON stated that in Indochina sheep were believed to be carriers of the virus.—J. F.

RANDALL, R., & EICHHORN, E. A. (1941). **Westward Spread of Eastern Type Equine Encephalomyelitis Virus.**—*Science.* **93.** 595.

The existence of Eastern type encephalomyelitis in a horse in part of Texas bordering on the Gulf of Mexico has been confirmed by cross-immunity tests. In the early part of 1941, 60 horses in this area were reported to have succumbed to the disease. The authors conclude that the geographical limitation of the virus entities has now been disrupted.—D. D. OGILVIE.

BIRCH, F. M. (1941). **Studies on Equine Encephalomyelitis.**—*Amer. J. vet. Res.* **2.** 221–226.

Thirty transfers were made with each of eight strains of Western E.E. virus in order to ascertain the effect on pathogenicity of g. pig passage. Seven of the eight strains increased in virulence after repeated passage. After about ten transfers there was a tendency for the virus to become fixed. The eighth strain appeared to be more virulent during some of the early passages, than after a number of later ones.

In an attempt to reduce bacterial contamination in suspensions of infected brain, ether was added in concentrations of 10, 20, and 30%, but it was found to be viricidal.—ISOBEL W. BURTON.

SHAHAN, M. S., & EICHHORN, E. A. (1941). **Studies of Chick-Embryo-Propagated Equine Encephalomyelitis Virus and Vaccine: Antigenicity and Preservation.**—*Amer. J. vet. Res.* **2.** 218–220.

Tests were carried out to determine the effect of continuous passage through chick embryos on the antigenic properties of the Western virus. The virus was propagated in two series:—(1) 226 passages through embryos, and (b) several passages through embryos, interrupted periodically by passage through a horse, and recovery from the latter by intracerebral inoculation of a g. pig (121 transfers altogether, including three in the horse). Transfers were made at intervals of 1–10 days. The inoculum used was embryo tissue, diluted to 10^{-1}–10^{-4}, or undiluted allantoic tissue.

Throughout the tests the virus in both series remained specifically Western and fully virulent, and no essential difference in potency of vaccines was found at any stage, even at the end of the series.

Various methods of preserving uniformly infective virus in g. pig brain and embryo tissue were tried, including desiccation by vacuum of rapidly frozen virus, rapid freezing alone, and desiccation in a vacuum over P_2O_5; the last method appeared to be most effective. Virus was preserved for at least one year by rapid complete drying *in vacuo* over P_2O_5, followed by storage in the refrigerator in a high degree of vacuum. Apart from a slight initial drop in infective titre, the virus retained an essentially uniform infective level for 6–12 months.—ISOBEL W. BURTON.

CASSAMAGNAGHI, A. (1941). Informe elevado a la Dirección de Ganadería por el encargado de la sección epizootías Dr. Antonio Cassamagnaghi sobre encefalomielitis. **[Report on Equine Encephalomyelitis in Uruguay].**—*Bol. mens. Direcc. Ganad., Montevideo.* **25.** 31–43.

This is a report on an epizootic of E.E. which occurred in Uruguay in 1941 and caused the death of about 2,000 horses. The results of the investigations indicate that the disease was caused by the same virus as was present in the Argentine, where there was an outbreak at the same time. As far as could be ascertained, the disease was introduced into Uruguay from the Argentine by horses with a latent infection.

The epizootic occurred in districts where mosquitoes and other biting insects are numerous and these are considered to have been the vectors of the disease. In two places where there were outbreaks, cases of encephalitis occurred in cattle, and it is suggested that there may be a relationship between the two conditions; apparently, however, no special investigation was made. No cases of encephalitis in human beings were reported during the outbreak. About 110,000 equine animals in the affected districts were inoculated with carbolized chick-embryo vaccine with good results.—M. WATSON.

I. FEEMSTER, R. F., & GETTING, V. A. (1941). **Distribution of the Vectors of Equine Encephalomyelitis in Massachusetts.**—*Amer. J. publ. Hlth.* **31.** 791–802.

II. BUSS, W. C., & HOWITT, B. F. (1941). **Human Equine Encephalomyelitis in Kern County, California 1938, 1939, and 1940.**—*Ibid.* 935–944.

III. WOLFE, W. R., & TRUM, B. F. (1940). **Anaphylactic Reactions Following the Use of Chick Embryo Equine Encephalomyelitis Vaccine.**—*Vet. Bull. U.S. Army.* **34.** 226–228.

IV. HAMMON, W. MCD., GRAY, J. A., Jr., EVANS, F. C., IZUMI, E. M., & LUNDY, H. W. (1941). **Western Equine and St. Louis Encephalitis Antibodies in the Sera of Mammals and Birds from an Endemic Area.**—*Science.* **94.** 305–307.

I. This is a survey of the prevalence and distribution of mosquitoes in Massachusetts, with special reference

to the members of the genus *Aëdes*. Of the six species of *Aëdes* known to transmit the Eastern virus, three, *viz*, *A. cantator*, *A. sollicitans*, and *A. taeniorhynchus*, breed in salt marshes and are found only along the coast, generally not more than five miles from the nearest salt water. The other three, *A. atropalpus*, *A. triseriatus*, and *A. vexans* are fresh-water species, and are distributed throughout the state. These mosquitoes seldom enter buildings, so that horses pastured in the open more often contract E.E. than those kept in stables. The peak prevalence of vectors is found to be late in August.

II. E.E. was found to be endemic among the human and equine populations of the county. The localities affected were well irrigated rural districts, where mosquitoes were numerous. Of 112 human cases of encephalitis investigated, 97 gave positive reactions to the serum-neutralization test for E.E. Of 82 cases diagnosed as poliomyelitis, five were positive for the equine virus. The sera of some sick and well contacts were also found to contain neutralizing antibodies. The age range of human cases was from three weeks to 63 years, with the largest percentage under ten years of age, and a noticeable number under one year; male patients predominated. The seasonal incidence was from May to September.

III. Out of 1,014 army horses and mules vaccinated in 1940, most of which had been vaccinated in 1939, four animals showed reactions of an anaphylactic nature. The symptoms were those of a transient colic, accompanied, in two cases, by oedema of the lips, nostrils, and eyelids, and hypersensitivity of the skin. Injections of adrenalin in the two latter cases quickly resulted in a return to normal. In three cases the symptoms followed the first dose and in the fourth they followed the second dose. All four affected animals had been vaccinated in the previous year.

IV. This is an investigation into the incidence of neutralizing antibodies in the sera of domestic and wild mammals and birds. The standardized intracerebral technique was used (Hammon and Izumi). A positive result for the Western equine virus indicated an ability of the serum tested to protect all the mice against at least ten times the greatest quantity of virus which would permit similar survival in the presence of a negative serum, under identical conditions of time, temperature, and serum concentration. A positive result for the St. Louis virus indicated protection against a 33-fold increase in virus. The results indicated a probable widespread infection of animals and birds, the highest incidence being in domestic birds.

Antibodies for the St. Louis virus were present in 50% of domestic and 15% of wild birds examined, and in 37·7% of domestic and 9·2% of wild mammals. For the Western equine virus, antibodies were found in 48·7% of domestic and 20% of wild birds, and in 32·4% of domestic and 5·1% of wild mammals.

This preliminary report cannot be accepted as significant until the viricidal properties of the sera are proved to be specific.—Isobel W. Burton.

Webster, L. T. (1941). **Classification of Primary Encephalitides of Man according to Virus Etiology: Present Status.**—*J. Amer. med. Ass.* **116.** 2840–2841.

This article consists essentially of a table comparing rabies, louping ill, equine encephalomyelitis, poliomyelitis, St. Louis encephalitis, Japanese B encephalitis, "X" disease, lymphocytic choriomeningitis, and B virus disease. The points of comparison include occurrence, transmitted infective agent, antibody formation, presence of P.M. diagnostic lesions, response of experimental animals, animal reservoirs, and transmitting agent.

—J. E.

Leake, J. P. (1941). **Epidemic of Infectious Encephalitis.**—*Publ. Hlth Rep., Wash.* **56.** 1902–1905.

A short report on the encephalitis epidemic of 1941 in North and South Dakota, Minnesota, and Manitoba and other neighbouring parts of Canada. The symptoms were those of the St. Louis type of infectious encephalitis, but were generally milder. The Western type of equine encephalomyelitis virus was recovered from the cases tested. There did not seem to be any connexion between cases in horses and cases in human beings, and the peak prevalence in horses occurred several weeks before the peak of the outbreak in human beings. There was also little evidence of spread by contact between human cases. The incidence was predominantly rural, and coincided with mosquito prevalence, although the heaviest mosquito infestation was some weeks before the heaviest incidence of infection in human beings. In four or five cases there was evidence of placental transmission.—Isobel W. Burton.

Eklund, C. M. (1942). **Human Encephalitis Due to the Virus of Equine Encephalomyelitis.**—*Vet. Med.* **37.** 70–76.

Human encephalitis in the U.S.A. due to E.E. virus is discussed, together with differential diagnosis from lethargic encephalitis ("sleepy sickness") and St. Louis encephalitis. An epidemic of human encephalitis due to Western E.E. virus is described and an attempt is made to correlate the disease in man and horses.

—D. D. Ogilvie.

Cox, H. R., Jellison, W. L., & Hughes, L. E. (1941). **Isolation of Western Equine Encephalomyelitis Virus from a Naturally Infected Prairie Chicken.**—*Publ. Hlth. Rep., Wash.* **56.** 1905–1906.

Western E.E. virus was isolated from the brain and spleen of a "prairie chicken" (*Tympanuchus cupido americanus*), shot in North Dakota, during the time when human epidemic cases were occurring in the vicinity. The bird appeared to be ill, but was able to fly, although it had a maggot-infested breast wound. The infestation, however, had been acquired within the previous 48 hours.—Isobel W. Burton.

San Martín, J. (1939). La rabia en los animales. **[Rabies in Animals].**—*Rev. Med. trop. parasit., Habana.* **5.** 125–177.

This is a detailed review of present knowledge of the subject, but nothing new is contributed.—M. Watson.

—. (1941). **[Report of Committee on] Rabies.**—*J. Amer. vet. med. Ass.* **99.** 438.

The committee's usual practice of formulating proposals for the control of rabies is broken this year, pending the formation of a rabies committee composed of seven interested bodies including the A.V.M.A. and representatives of veterinary, medical, and livestock interests and the U.S. Department of Agriculture.—J. E.

—. (1941). Tollwut-Merkblatt. **[Notice on Rabies].**—*Reichsgesundheitsblatt.* **16.** 714–717.

This official description of rabies is produced for the information of the populace of areas where rabies exists and describes the sources of infection, the symptoms in infected animals, control, and treatment of persons attacked by animals. The Pasteur treatment is available with vaccine prepared at Berlin, Breslau, and Vienna.

—J. E.

*Schükrü, A., & Zekai, T. (1940). Aujeszkysche Erkrankung in der Türkei bei Mensch und Tier. **[Aujeszky's Disease in Man and Animals in Turkey].**—*Z. Neurol.* **169.** 598–606. [Abst. from abst. in *Zbl. Bakt. I.* (*Ref.*) **139.** 311].

In dogs, cats, and rabbits with spontaneous Aujeszky's

disease, the authors found a diffuse meningo-encephalitis, especially in the cerebral cortex and the walls of the ventricles. Plasma cells were prevalent, and there were also numerous leucocytes. The nerve plexuses were infiltrated. In contrast with rabies, the pons and medulla oblongata were almost always free of inflammatory changes. Cell inclusions and elementary bodies were not found. Two laboratory assistants, who cut themselves while handling infective material, developed itching and erythema of the skin and, in one case, aphthous lesions occurred on the oral mucous membrane. After three days both patients were fully recovered. Rabbits inoculated with blood taken from these cases at the height of illness, developed Aujeszky's disease in 18 hours.

FABER, H. K., & SILVERBERG, R. J. (1941). **Experimental Air-Borne Infection with Poliomyelitis Virus.**—*Science.* **94.** 566–568.

A description is given of experimental infection of monkeys with poliomyelitis virus by droplet nuclei. Forty-seven rhesus and 13 cynomolgus monkeys were exposed in a modified WELL'S (1934) apparatus. Thirty-one of the rhesus and six of the cynomolgus monkeys were subjected to preliminary blockade of the olfactory mucosa with 1% zinc sulphate solution ; the remainder were exposed to infection but were not blockaded. Only ten monkeys contracted poliomyelitis, *viz*, two blockaded rhesus, and two blockaded and six unblockaded cynomolgus monkeys.

In discussing the results, the authors suggest that the rhesus monkeys became infected through the lower respiratory tract (below the epiglottis) and the others through the oropharynx. The theory is advanced that human poliomyelitis may, at least occasionally, be an air-borne infection and that the lung may be a portal of entry.—D. D. OGILVIE.

GAHAGAN, L., & STEVENSON, L. D. (1941). **A Strain of Virus Producing Meningo-Encephalomyelitis in Mice, with Special Reference to Pathogenesis.**—*J. infect. Dis.* **69.** 232–237. [Authors' summary copied *verbatim*].

Spontaneous meningo-encephalomyelitis in mice produced by a filterable virus is described. The disease is transmissible by intracerebral inoculation of a fresh or frozen suspension of brain or spinal cord of a recently paralyzed mouse, and has not been recovered from mice paralyzed for more than 9 days. It has not been transmitted by intranasal instillation of such material.

The lesions in the central nervous system produced by the disease include perivascular and diffuse infiltration of lymphocytes, gliosis, ganglion cell necrosis, meningeal infiltration of lymphocytes, and leptomeningeal hemorrhage.

OHMAN, A. F. S. (1941). **A Note on Contagious Pustular Dermatitis (Scabby Mouth) of Sheep.**—*Aust. vet. J.* **17.** 106–107.

An outbreak of scabby mouth occurred among one-year-old rams and a considerable proportion also developed lesions of the disease on the scrotum. The scrotum was much enlarged and water-clear fluid could be aspirated. Scabs from the scrotum inoculated on to other sheep produced typical lesions about the mouth, on the thigh, and on the scrotum.—W. I. B. BEVERIDGE.

FUST, B. (1940). Eine Kaninchenpocken-Epizootie und Untersuchungen über die immunologischen Beziehungen zwischen Kaninchenpocken, Vaccine und einem durch Hoden-Blindpassagen gewonnen übertragbaren Agens. **[An Epizootic of Rabbit Pox, and the Connexion Between Rabbit Pox, Vaccinia, and an Infectious Agent Obtained by Testicular Passage].**—*Arch. ges. Virusforsch.* **1.** 313–323.

A spontaneous outbreak of rabbit pox was studied. It was found that there is a close relationship between rabbit pox and vaccinia virus : rabbits which had recovered from rabbit pox were immune to vaccinia virus, but the reverse did not hold true. An infectious agent obtained by testicular passage was sometimes found to consist of two components. The inconstant component was identified as vaccinia virus, but the other component was not identified. In work with rabbits the possibility of a latent infection with vaccinia or rabbit pox should be kept in mind. [See also *V. B.* **10.** 693.]
—JOHN FRANCIS.

NELSON, J. B. (1941). **The Behavior of Pox Viruses in the Respiratory Tract. IV. The Nasal Instillation of Fowl Pox Virus in Chickens and in Mice.**—*J. exp. Med.* **74.** 203–212. [For part III, see *V. B.* **11.** 450].

Fowl-pox virus was established in the nasal passages of chicks by the intranasal instillation of follicular virus and was maintained for 12 successive generations made at intervals of 10–11 days. Recovered birds were immune to virus suspensions applied to the feather follicles. There was no demonstrable transference of virus to normal birds placed in contact with fowls infected in this manner.

The nasal instillation of egg-passage fowl pox produced a milder disease. There was no evidence of a mucosal reaction while elementary bodies were absent ; nevertheless, virus was demonstrated in small amounts by dermal tests. Recovered birds were not completely immune. It is considered probable, therefore, that the nasal tract is of little significance in the spread of fowl pox under natural conditions.

Mice infected intranasally with egg-membrane virus failed to show any symptoms, but virus was recoverable from the lungs between the third and seventh days, while a slight pulmonary reaction was observed.
—R. E. GLOVER.

BOURDILLON, J., & LENNETTE, E. H. (1940). **Electrophoresis of the Complement Fixing Antigen of Human Influenza Virus.**—*J. exp. Med.* **72.** 11–19.

The sera from normal and influenza-infected mice showed no significant differences when examined in the electrophoresis apparatus. A solution of protein extracted from the lungs of influenza-infected mice contained two electrophoretically distinguishable components, which the authors consider to consist chiefly of serum albumin and haemoglobin respectively. A soluble complement-fixing antigen, not resolvable optically by the electrophoretic technique, is present in such extracts. Its mobility was determined by taking samples from the U-tube after various periods of electrophoresis and carrying out c.-f. tests. The mobility of the soluble complement-fixing antigen was found by this method to lie close to that of serum α-globulin.
—R. A. KEKWICK.

HORSFALL, F. L., Jr., & RICKARD, E. R. (1941). **Neutralizing Antibodies in Human Serum after Influenza A.**—*J. exp. Med.* **74.** 433–439.

Samples of serum taken from patients during the acute phase of an influenza attack were compared with convalescent sera from the same patients obtained at intervals of 11–360 days after the onset of symptoms. The antibody content was determined in mice by the serum dilution end-point method suggested by REED & MUENCH [*V. B.* **11.** 812.], PR.8, W.S., swine influenza, and a virus isolated from one of the patients being used as antigens. Although there was an increase in neutralizing antibodies, there was a complete lack of strain specificity. The antibodies resulting from infection seemed to possess a very broad reactivity, the increases to the

antigenically remote swine virus being almost identical to those occurring with different strains of the influenza A virus itself. There was also a steady decline in antibody which was independent of the strain of virus used as a test antigen.—R. E. Glover.

Hirst, G. K. (1942). **The Quantitative Determination of Influenza Virus and Antibodies by Means of Red Cell Agglutination.**—*J. exp. Med.* **75.** 49–64.

Suspensions of influenza A virus, obtained from centrifuged infected mouse lung or from the allantoic fluid of infected eggs and added to a 2% washed suspension of fowl red blood cells, caused a visible agglutination of the cells after one hour at room temperature. The end point was taken as the tube showing a density of 0·75–0·5% of a standard determined by matching with control tubes of known strengths of r.b.c. It was found that when the same strain of virus (PR.8) was tested by the agglutination technique and by the intranasal inoculation of mice, the titres of the suspensions were parallel over a wide range of virus concentrations, provided that the virus suspensions were fresh. On storage the infectivity of the virus diminished, whereas its agglutinating capacity was unaffected.

When human or ferret sera containing influenza neutralizing antibodies were added to the virus suspensions, r.b.c. agglutination was inhibited and the amount of antibody could be titrated by determining the dilution of serum at which the inhibiting effect was no longer demonstrable. In the case of ferret, mouse, and other sera the test was complicated by a heat-labile agglutination-inhibiting substance present in normal serum, but as the inhibiting titre of most immune sera was usually beyond the range of the normal substance, no serious difficulty was encountered. Human sera taken in the very early stages of an influenza attack were compared with convalescent samples from the same individuals. Any change in titre was attributed to an increase in specific antibodies.

A comparison of several strains of virus by the serum inhibition test showed that A strains were antigenically distinct from B strains, thus confirming previous findings in mice. PR. 8, W.S., and swine influenza virus (Shope) all showed some inter-relationship, the last being more closely related to W.S. than to PR.8.

—R. E. Glover.

*Tornack, J. H. (1940). Ueber den Nachweis von Psittakosevirus im histologischen Präparat und das Vorkommen von Einschlüssen in mononukleären Zellen von Milz und Leber psittakoseinfizierter Wellensittiche. **[Demonstration of Psittacosis Virus in Histological Preparations and Occurrence of Inclusion Bodies in Mononuclear Cells of Spleen and Liver of Infected Zebra Parakeets].**—*Zbl. Bakt. I.* (*Orig.*). **146.** 313–318. [Abst. from abst. in *Zbl. Bakt. I.* (*Ref.*). **139.** 314].

Examination of Giemsa-stained preparations of liver and spleen of parakeets showed "virus colonies" in almost half of positive cases 24 hours after infection with psittacosis. A type of mononuclear phagocyte is described, which is distinguishable by characteristic inclusions, and which was found in the liver and spleen of parakeets known from animal experiments to be virus carriers, and also in birds in infected surroundings which could not be shown to transmit the virus. These inclusion cells could not be found in unexposed birds, shown by animal test to be uninfected. These cells give, therefore, reliable evidence for the diagnosis in parakeets of a recovered psittacosis infection, which is not revealed by animal experiment. By this observation, the possibility is opened up of expediting both the diagnosis of human cases and the seizure of the responsible carrier birds.

Kikuth, W., & Gönnert, R. (1940). Erzeugung von Ektromelie durch Provokation. **[Artificial Production of Ectromelia].**—*Arch. ges. Virusforsch.* **1.** 295–312.

During passage experiments with influenza virus, in which infective mouse-lung tissue was used as an inoculum, ectromelia was produced in the inoculated mice. This disease was then studied and it was concluded that large numbers of mice are latently infected with ectromelia virus. [See also *V. B.* **10.** 693.]—John Francis.

Scheidegger, E. (1940). Experimentelle Untersuchungen über die Wirkung von Lysozym auf menschen- und tierpathogene Virusarten. **[Experimental Investigations on the Action of Lysozyme on Pathogenic Viruses].**—*Arch. ges. Virusforsch.* **1.** 394–403.

It was shown that highly active lysozyme from fowls was without action on vaccinia, herpes, rabies, equine encephalomyelitis, influenza, or fowl plague viruses. Previous workers have shown that influenza virus is resistant to human lachrymal fluid and cat saliva, as well as to fowl lysozome.—John Francis.

*Ohashi, S. (1940). Ueber die Ausscheidung von Bakteriophagen mit dem Kot bei Hühnern im Winter. **[Excretion of Bacteriophage in Faeces of Fowls in Winter].**—*Zbl. Bakt. I.* (*Orig.*). **146.** 186–188. [Abst. from abst. in *Zbl. Bakt. I.* (*Ref.*). **139.** 28].

In hens fed on wheat bran a high level of bacteriophage excretion develops in summer, but none is excreted in winter. Oral administration of such substances as castor oil, alcohol, or sodium bicarbonate, stimulates excretion to a certian degree. During part of the winter, however, fowls are completely refractory to such stimuli.

SPONTANEOUS AND TRANSMISSIBLE NEOPLASMS AND LEUCAEMIAS [INCLUDING FOWL PARALYSIS]

Kress, F. (1941). Fettsäurekristalle in multiplen Lipoblastomen bei der Gemse. **[Fatty Acid Crystals in Multiple Lipoblastomas in a Chamois].**—*Wien. tierärztl. Mschr.* **28.** 465–469.

A case of multiple lipoblastoma in a seven-year-old chamois is described. An unusual feature was the occurrence of fine needle-like crystals, rather than fat, in most of the tumour cells. Evidence is offered that these crystals consisted of fatty acids, presumably formed from fat by the action of lipase present in the tumour cells.—J. G. Carr.

Matzke, M. (1941). Untersuchungen über die Spezifität der Zellinfiltrate. **[Specificity of Cellular Infiltrations in Experimental Fowl Paralysis].**—*Tierärztl. Rdsch.* **47.** 499–503.

Two groups of fowls, free from F.P., were inoculated intra-abdominally, one group with normal nerve tissue and the other with affected nerve tissue from cases of F.P., and their nervous systems examined for the presence of cellular infiltration characteristic of F.P. Although slight cellular infiltrations were found in the brain of a few birds receiving normal nerve tissue, they differed from those of F.P. (as shown in two figs.), seen in the fowls given F.P. material.—A. Cucka.

*Wagener, K., & Matzke, M. (1940). Das Geschlechterproblem bei der Geflügellähme. **[The**

Influence of Separation of the Sexes on the Occurrence of Fowl Paralysis].—*Tierärztl. Rdsch.* 343–347. [Abst. from abst. in *Zbl. Bakt. I.* (*Ref.*). **139.** 346].

A series of six experiments was carried out on 292 young fowls in order to test the hypothesis of TE HENNEPE, that separation of the sexes favours the development of fowl paralysis. This hypothesis was not confirmed. The results revealed, however, the importance of the connexion of clinical with latent cases of the disease. It was shown that separation of the sexes increased the incidence of latent infection. In mixed groups, on the other hand, there were more clinical cases, especially among the cocks, while sexual intercourse not only promoted spread of the disease, but increased its severity in both sexes.

HUTT, F. B., COLE, R. K., & BRUCKNER, J. H. (1941). **Four Generations of Fowls Bred for Resistance to Neoplasms.**—*Poult. Sci.* **20.** 514–526.

The work reported represents an attempt to breed a strain of White Leghorns genetically resistant to neoplasms and at the same time to improve certain economic characters. Concurrently a separate line was bred in an endeavour to maintain susceptiblity. Both resistant and susceptible lines were mixed together at all periods of their life. No special precautions were taken to prevent the introduction of other diseases.

In the original unselected population total mortality in pullets between 160–500 days of age was 64%. In the fourth generation this was reduced to 38% in the selected birds, whilst the susceptible line was maintained at 61%. The incidence of neoplasms in the original population was 16%. In the fourth generation, it was 12% in the resistant line and 26% in the susceptible line. Body size, egg weight, and egg production were significantly improved by selection. The authors consider that the results should encourage poultry breeders to select for genetic resistance to disease.

—F. D. ASPLIN.

IMMUNITY

VELLISTO, E. (1941). Nachweis von spezifischen Agglutininen in Muskeln und den Organen geschlachteter und verendeter Tiere. **[Demonstration of Specific Agglutinins in the Muscles and Organs of Slaughtered and Dead Animals].**—*Z. Fleisch- u. Milchhyg.* **51.** 116–118 and 128–131.

The author made a rather limited number of observations on the practicability of diagnosing certain bacterial infections by means of agglutinin tests made with extracts of muscle, liver, or spleen. Extracts were made by grinding 4 g. of tissue in 10 ml. of 0·5% phenol saline, heating at 57°–58°C. to coagulate proteins, and finally filtering through paper. Agglutination tests were held at 0°C., because at higher temperatures nonspecific clumping was apt to occur, and the results were read after one or more days. The titres of muscle extracts were $\frac{1}{32}$–$\frac{1}{128}$, and liver and spleen extracts $\frac{1}{4}$–$\frac{1}{32}$ of the corresponding blood titre. It was found necessary, therefore to start the aggln. tests at a dilution of 1 : 2·5 The observations were made with brucella, *Salmonella typhi-murium* and *S. enteritidis* suspensions.—A. W. S.

KRAGE, P., & KNOBLOCH, G. (1941). Beschleunigte Agglutination zur Feststellung der Bang-Infektion der Rinder. **[Rapid Agglutination Test for Bovine Brucellosis].**—*Tierärztl. Rdsch.* **47.** 431–432.

An article pointing out the advantages of the method.

—J. G. CARR.

*ZEH, O. (1940). Die Frischmilch-Schnellagglutination mit der Abortus-Bang-Testpaste nach Schönberg und Imig als Hilfsmittel für die Abortusbekämpfung. **[Rapid Fresh Milk Agglutination with Schonberg and Imig's Test Paste for the Diagnosis of Bovine Brucellosis].**—*Vet.-med. Nachr. Bayer-Meister Lucius.* No. 1/4. pp. 12–16. [Abst. from abst. in *Tierärztl. Rdsch.* **47.** 460].

This is a rapid agglutination method for the detection of udder brucellosis in cattle. No details of the technique employed are given in the abstract but it is stated that the test involves the use of individual milk samples and a so-called *Br. abortus* test paste [presumably a brucella antigen in a suitable vehicle], and that it can be carried out by the veterinary surgeon on the farm. The test is said to be reliable for the examination of quarter samples, but to give less certain results in the case of whole udder samples.—M. LANDAU.

*KEYSER, K. H. (1939). Untersuchungen über die Brauchbarkeit der "Abortus Bang-Testpaste" nach Schönberg-Imig in der Praxis. **[The Value of the Schonberg-Imig Test Paste for *Brucella abortus* Infection].**—*Inaug. Diss., Hanover.* [Abst. from abst. in *Zbl. Bakt. I.* (*Ref.*). **139.** 321].

This test is said to be fairly reliable as a quick aid to the examination of a herd of cows, fresh milk being used. At low titres it is, however, uncertain and the slow whey agglutination method should be used. The test paste method is unsuitable for use with fresh blood.

*BORTOLOTTI, M. (1941). Agglutinazione con estratti dal coagula del sangue. **[Agglutination with Clotted Blood Extract (Brucellosis)].**—*Nuova Vet.* **18.** 99–101. [Abst. from abst. in *Tierärztl. Rdsch.* **47.** 519].

B. found that aggln. tests could be made with blood clots rubbed down and extracted by an equal weight of normal saline, the clear supernatant fluid being used for the test. The presence of haemoglobin did not spoil the test and blood samples 24 hours old were quite suitable for use.

PIJPER, A. (1941). **Dark-Ground Studies of Vi Agglutination of *B. typhosus*.**—*J. Path. Bact.* **53.** 431–436. [Author's summary copied *verbatim*].

Dark-ground microscopic studies of the three types of agglutination of which typhoid bacilli are capable (H, O and Vi) have been made with the sun as the source of light. Sunlight is the only light source that will make the motile organs visible and capable of being photographed. In this way the following points have been demonstrated.

1. In H agglutination the specific action of the serum is to cover the tails and flagella with a sheath. The thickened motile organs then get entangled mechanically.

2. In O agglutination the bacilli no longer repel but become attracted towards one another. They approach each other head first, become attached in polar fashion and build up characteristic patterns resembling crystals.

3. In Vi agglutination there are three factors: a growing paresis of motile organs, the normal repulsion between bacilli and a stickiness of the surface of the bacilli. The paresis causes erratic movements, which overcome the normal repulsion, and the stickiness makes accidental contacts permanent. Side-to-side attachments prevail.

It is curious that of the three processes the Vi agglutination process, the last to be discovered, is the only one for which the word "agglutination" in the literal sense is really appropriate.

PIJPER, A. (1941). **The Microcinematography of the Agglutination of Typhoid Bacilli.**—*J. Bact.* **42.** 395–409.

A description is given of a sunlight-dark-ground technique for making 16 mm. microcinematographic pictures to illustrate the motility and somatic and flagellar types of agglutination of typhoid bacilli in films of diluted broth culture. The mode of propulsion was shown to be by a long spiral tail formed by two coiled flagella, the bacilli appearing to avoid collision by virtue of their similar electric charge. Somatic agglutination was demonstrated as the result of interbacillary attraction acting in the direction of the long axis of the bacillus and leading to clumping in orderly patterns, while flagellar agglutination was produced as a merely mechanical after-effect of the irregular, purely fortuitous, entanglement of the flagella, thickened and immobilized by the deposit of a sheath of small coalescent granules.
—R. O. Muir.

Ganslmayer, I. H. (1940). Serotherapie und Simultanimpfung bei den Eiterungen des Menschen und der Tiere. **[Serotherapy and Simultaneous Inoculation for Suppurations in Man and Animals].**—*Berl. Münch. tierärztl. Wschr.* Sept. 20th. 453–456.
A preliminary account of cases of local suppuration cured or prevented by sera produced in a new way by G. It is stated that the technique will be divulged after the completion of further experiments.

Schütze, H. (1941). **The Optimal Spacing of Vaccine Inoculations.**—*J. Path. Bact.* **53.** 443–446.
An alteration in the spacing between two doses of *Salmonella typhi-murium* vaccine for mice from an interval of one week to one of four weeks was made in order to ascertain whether any difference in the active immunity of the mice was noticeable. The sera of the immunized mice were tested for agglutinin content against a formolized suspension of the O variant of *S. typhi-murium* and their active immunity was tested by intraperitoneal inoculation with the virulent strain used in preparing the vaccine. The effect of immunization was estimated by the prolongation of life of the mice resulting from the vaccination. The increased interval between inoculations resulted in an improvement in the antibody of the sera ; 31 mice receiving the doses at a week's interval had a mean titre of 1 : 60, whereas 36 mice receiving the doses at a four-weeks' interval had a mean titre of 1 : 160.—E. C. Hulse.

Stiles, M. H. (1941). **Nonfilament-filament Ratio Changes Following Administration of Autogenous Vaccines to Persons with Low-Grade Chronic Illness.**—*J. Lab. clin. Med.* **26.** 1453–1460.
Autogenous vaccines were injected into groups of persons with low grade chronic illness. Blood smears were made at frequent intervals and the response to the vaccine estimated by following the ratio of non-filamented to filamented (non-segmented to segmented) neutrophiles. The ratio, which is expressed in percentage form, showed an increase during the period of reaction to the vaccine and a decrease as the symptoms subsided. These variations were statistically significant.
—R. E. Glover.

I. Menkin, V., Kadish, M. A., & Sommers, S. C. (1942). **Leukocytosis-Promoting Factor in Inflammatory Exudates of Man.**—*Arch. Path.* **33.** 188–192. [Authors' conclusions copied *verbatim*].

II. Menkin, V., & Kadish, M. A. (1942). **Presence of the Leukocytosis-Promoting Factor in the Circulating Blood.**—*Ibid.* 193–197. [Authors' summary copied *verbatim*].

I. The leukocytosis-promoting factor found in inflammatory exudates of dogs and rabbits is likewise present in the exudative material of man. The leukocytosis-promoting factor is readily recovered as an active globulin fraction from various samples of empyema fluids. Its injection into the blood stream of a dog induces, within several hours, a significant rise in the number of circulating leukocytes. Differential counts indicate that the leukocytosis is doubtless referable to a discharge of immature granulocytes from the bone marrow.

II. There is present in inflammatory exudates a globulin, termed the leukocytosis-promoting factor, which *per se* offers a reasonable explanation for the mechanism of leukocytosis with inflammation. The blood serum of a normal animal fails to reveal the presence of this substance. On the other hand, the leukocytosis-promoting factor is recovered in measurable quantities from the serum of a dog with an acute inflammatory reaction. The significance and possible application of this fact are pointed out.

van der Scheer, J., Wyckoff, R. W. G., & Clarke, F. H. (1941). **An Electrophoretic Examination of Digested Sera.**—*J. Immunol.* **41.** 349–360. [See also *V. B.* **11.** 877, and **12.** 95].
The electrophoretic examination of several diphtheria and tetanus antitoxic horse sera during the course of digestion with pepsin at pH 4 and 37°C., shows that the albumin is rapidly hydrolysed. The T component appears to merge with the γ-globulin, and on further digestion this persists, while the other serum components are broken down and their hydrolysis products can be dialysed away. With anti-pneumococcal horse serum, the initial large amount of γ-globulin is rapidly digested, but a precipitin reaction can still be obtained. On such a serum being heated at pH 4 and 37°C. in the absence of pepsin, there is a 94% loss of activity.—R. A. K.

Bateman, J. B., Calkins, H. E., & Chambers, L. A. (1941). **Optical Study of the Reaction Between Transferred Monolayers of Lancefield's " M " Substance and Various Antisera.**—*J. Immunol.* **41.** 321–341.
The early part of the paper consists of an exhaustive theoretical discussion of the methods used in studying protein monolayers built up on plates covered initially with a barium stearate layer by the Blodgett-Langmuir method.

Monolayers of Lancefield's " M " substance were found capable of reacting specifically with homologous serum, and cross-reactions with other antistreptococcal sera were observed. The rate of deposition of antibody was quantitatively studied with reference to the concentration of antiserum applied. At high dilutions of antiserum the thickness of the deposited antibody layer was considerably less than for more concentrated antiserum, and this was attributed to differences in the mode of orientation of antibody molecules at the active surface. It is claimed that antibody concentrations of about 4×10^{-7} g. per ml. can be detected by the method.
—R. A. Kekwick.

Treffers, H. P., & Heidelberger, M. (1941). **Quantitative Experiments with Antibodies to a Specific Precipitate. I and II.**—*J. exp. Med.* **73.** 125–140 and 293–297.

I. It has previously been shown that antibodies are related to two antigenic fractions of horse serum designated A and B. The antitoxic globulins constitute part of the A fraction, and most of the antibacterial antibodies belong to the B group. It has also been concluded that typhoid, plague, and type I pneumococcus antibodies from horse sera are almost, if not completely, identical as antigens.

In this study a specific precipitate derived from anti-

pneumococcus type II horse serum was used as antigen for the production of immune serum in rabbits. Specific precipitates derived from various antibacterial sera prepared in horses reacted in the same way with this rabbit antiserum. On the other hand, water-soluble antibodies formed in the horse in response to injections of diphtheria toxin and crystalline egg albumin precipitated only 50–60% of the antibody from the rabbit antisera to the type II antipneumococcus specific precipitate. Although all of the antigens used in the form of specific precipitates and antibody solutions were horse proteins, each had at the same time the unique property, as an antibody, of reacting specifically with an antigen. It was not possible to demonstrate any variation due to the type-specific antibody groupings by passive anaphylaxis tests in g. pigs.

It was concluded that the two sets of groupings in the horse pneumococcus antibody, those functioning as antigens and those acting as antibodies, are independent and that the groupings responsible for their antibody function constitute either a small part of the total protein molecule or are non-antigenic.

II. Antisera were produced in chickens with specific precipitates from type II pneumococcus horse and rabbit antisera. Using homologous reagents (*e.g.* horse anti-horse) the above results were confirmed, but no antibody was removed from chicken anti-horse specific precipitate serum by rabbit specific precipitates or *vice versa*. It was concluded that the antigenic specificities of antibodies from the horse and rabbit are not influenced by their particular antibody functions.

—John Francis.

PARASITES IN RELATION TO DISEASE [HELMINTHS]

Tomskikh, P. P. (1938). K izucheniyu hel'mintofauny ovets Yarosslavskoĭ oblasti. **[Helminth Parasites of Sheep in the Yaroslav District].**—*Trud. vsesoyuz. Inst. Helmintol.* **3.** 139–143. Moscow: Sel'khozgiz.

The species of nematodes found among 2,924 helminths in a sheep, obtained during the 54th Helminthological Expedition led by K. I. Skryabin, were :– in the small intestine *Trichostrongylus colubriformis, T. probolurus, Ostertagia circumcincta, Nematodirus spathiger,* and *Bunostomum trigonocephalum*; in the large intestine *Oesophagostomum venulosum, Chabertia ovina,* and *Trichuris skrjabini,* and in the abomasum *Trichostrongylus axei, Ostertagia circumcincta, O. trifurcata, O. lyrata, O. occidentalis,* and a new species named *O. volgaensis,* the male and female of which, as well as the differential diagnosis, are described. Besides these, eight female nematodes from the abomasum had two morphological modifications of the vulvar valves. In T.'s opinion these are either variants or malformed specimens of *O. circumcincta.*—A. Moldawsky.

Orlov, N. P., Koneva, Z. P., & Orlova, E. M. (1938). K voprosu o hel'mintofaune sobak v ovtsevodcheskikh khozyaĭstvakh Omskoĭ oblasti. **[Helminths Found in Dogs on Sheep Farms in the Omsk Region].**—*Trud. Omsk. vet. Inst.* **11.** 85–90.

The following helminths have been found in dogs in the Omsk region of central Siberia :– *Toxocara canis, Toxascaris leonina, Uncinaria stenocephala, Taenia hydatigena, T. multiceps, T. pisiformis, Echinococcus granulosus, Dipylidium caninum, Mesocestoides lineatus, Opisthorchis felineus,* and *Alaria alata.* In farm dogs which have been in close contact with sheep, *T. multiceps* and *T. hydatigena* are prevalent, which explains the high incidence of cysticercosis and coenurus in sheep.—A. M.

Erlich, I., & Mikačić, D. (1940). Parazitoloske pretrage purana (Meleagris gallopavo). **[Helminth Parasites of Turkeys in Yugoslavia].**—*Vet. Arhiv.* **10.** 115–129. [Abst. from English summary].

Fifty turkeys [age not stated in summary] were examined P.M. for parasites. Coccidia were found in only one bird. Two species of mites were found, *Laminosioptes cysticola* twice and *Cnemidocoptes mutans* once; other arthropods collected were to be described later. Helminths found included *Cyathostoma bronchialis* once, which is a new record for this host, and, from the crops of 12 of the birds, *Capillaria combologiodes* n.sp., so called because the oesophageal region looks to the unaided eye like a string of pearls. Other species found included *Raillietina cesticillus* in 8, *Hymenolepis carioca* in 10, *Choanotaenia infundibulum* in 2, *Echinostoma revolutum* in 1, *Ascaridia lineata* in 40, *Heterakis gallinae* in 29, and *Trichostrongylus tenuis* in 26 of the birds. A comparison was made of the intensity of parasitism of turkeys and fowls, and attempts were made to explain the lower incidence both of species and of numbers in turkeys.

Chavarría, M. (1939). Platelmintos determinados en los animales domésticos de México. **[Platyhelminths of Domestic Animals in Mexico].**—*Rev. mex. Med. vet.* **2.** No. 23. 13–18.

A list of platyhelminths found in domestic animals in Mexico. The only trematode given is *Fasciola hepatica.* Among the 22 species of cestodes, the occurrence of *Hymenolepis nana* is of interest.—Miller Watson.

Yosikawa, M., Miyata, I., & Uesugi, S. (1940). **Supplement to Information about Trematode Parasites of Dogs in Kobe.**—*Jap. J. vet. Sci.* **2.** 450–464. [In Japanese: abst. from English summary].

Seven species of Trematoda are described, *viz, Echinochasmus japonicus, Heterophyes heterophyes nocens, H. continuus, Metagonimus yokogawai ovatus, M. katsuradai, Monorchotrema yokagawai,* and *Pygidiopsis summus.* In all, four families, seven genera, and 11 species have been recorded in dogs in Kobe.—D. D. O.

I. Skarbilovich, T. S. (1938). K izucheniyu biologii Amidostomum anseris (Zeder, 1800), vozbuditelya zheludochnoglistnogo zabolevaniya guseĭ. **[Biology of *A. anseris*].**—*Trud. vsesoyuz. Inst. Helmintol.* **3.** 46–54. Moscow: Sel'khozgiz.

II. Gnedina, M. P. (1938). Izuchenie metodov terapii amidostomatoza guseĭ. **[Treatment of *Amidostomum* Infestation in Geese].**—*Ibid.* 55–58.

III. Vsevolodov, B. P. (1938). Materialy po patologicheskoĭ anatomii i histologii amidostomatoza guseĭ. **[Pathology and Histology of *Amidostomum* Infestation in Geese].**—*Ibid.* 59–63.

IV. Potemkina, V. A. (1938). Izuchenie diagnostiki himenolepidoza guseĭ i biologii ego vozbuditelya. **[Biology and Diagnosis of *Drepanidotaenia lanceolata* in Geese].**—*Ibid.* 97-126.

I. A study of the life-cycle of *A. anseris* in the outer world from the elimination of the ova to the attainment by the larvae of the infective stage. Experiments were made to establish the effects on ova and larvae of certain chemicals, of high temperatures, and of desiccation.

II. Sixty-two geese found on faecal examination by the method of Fülleborn & Darling to be infested with *A. anseris* were treated with carbon tetrachloride, copper sulphate, tetrachlorethylene, santonin, "osarsol", or naphthalene. Copper sulphate, naphthalene and santonin were found to be ineffective in tolerated doses. Five out of six geese treated with doses of 6–10 ml. of

carbon tetrachloride were found to be free from infestation P.M. After treatment with tetrachlorethylene and "osarsol" in doses of 0·5–1 ml., there was an average of 43 and 143 parasites respectively per bird, as compared with an average of 190 in the controls.

III. On macroscopic examination of the proventiculi and gizzards of eight geese infected with *A. anseris*, and microscopic examination of these organs from five geese, it was found that the predilection site was the lesser curvature of the gizzard and especially the pyloric region, where lesions of the mucous membrane were most pronounced. These lesions consisted in the destruction of the inner layers of the horny lining and extensive haemorrhage in the intermediate spaces between the layers.

It is pointed out that the loss of blood due to the haemorrhage and the destruction of the keratinoid cuticle, which is the main means of grinding the food, lead to anaemia, malnutrition, and death of the birds.

IV. A new description of the anatomy and morphology of *D. lanceolata* is given in this paper. The ova were found to live not less than ten days in conditions closely resembling those of the natural habitat of the parasite, not more than five days in putrid water, three days in faeces, and one day if kept dry at 18°C.

The cercocysts develop in the body of the intermediate host in 10–15 days and reach the invasive stage on the 30th day. Experimental infection of *Cyclops* with ova of *D. lanceolata* was successful with the species *leuckarti*, *oithonoides*, *diaphanus*, *viridis*, *albidus*, *strenuus*, *serrulatus*, and *speratus*.

The parasite reaches sexual maturity in the body of the host after 19 days, thus bringing the entire life-cycle up to a minimum of 50 days. Outbreaks occur near stagnant waters overgrown with weeds, beginning in June and reaching their peak at the end of July or the beginning of August. Losses among young birds (2–3 weeks old) may be up to 85%, but are slight among adult birds.

Treatment by means of arecoline in doses of 0·002 g. per kg. live weight for young, and of 0·005 g. per kg. live weight for adult birds proved most effective. Sixty infested birds experimentally treated were all free of parasites on P.M. examination.

As a measure of control it is recommended, in addition to the usual sanitary measures, that where several ponds isolated from one another are available, each should not be used for longer than 25–30 days in each season.

—E. MARTIN.

STUNKARD, H. W. (1941). **Studies on the Life History of the Anoplocephaline Cestodes of Hares and Rabbits.**—*J. Parasit.* **27.** 299–325.

S. presents a more detailed account [see also *V. B.* **8.** 443.] of the development of *Cittotaenia ctenoides*, from European rabbits, and observations on the life-cycles of *C. denticulata* and *C. pectinata*. Cysticercoids occurred naturally in three species of free-living mites collected near Hamburg; a larva from *Scutovertex minutus* developed, when fed to a young rabbit, into a sexually mature *C. ctenoides*. Eggs of this tapeworm when fed to 11 species of oribatid mites attained the cysticercoid stage in seven and were proceeding to develop normally in the remainder when the mites died. Partial development of *C. denticulata* cysticercoids was observed in five species of mites, but complete development only in a sixth, *S. minutus*. The developmental stages of *C. ctenoides* and *C. denticulata* in the intermediate hosts are described and figured from experimental infections, as is also the development of these two tapeworms and of *C. pectinata* from natural infections. Probably owing to immaturity, the cysticercoids from experimentally infected mites did not develop in rabbits. No evidence was found to support the idea that these tapeworms migrate from the intestine to the body cavity of normal, live rabbits.—J. N. OLDHAM.

CASE, A. A., & ACKERT, J. E. (1940). **New Intermediate Hosts of Fowl Cestodes.**—*Trans. Kans. Acad. Sci.* **43.** 393–396. [See also *V. B.* **11.** 455].

This article records the individual study of eight more species of beetles of four genera as intermediate hosts of *Raillietina cesticillus* and one further species of beetle as intermediate host of *Choanotaenia infundibulum*. All were parasitized by feeding them ripe tapeworm segments and not less than 15 days was allowed for the development of the cysticercoids before feeding them to chickens. Mixed infestations were induced in several species of beetles. (It was found that beetles could be successfully stored from one season to another if placed in fruit jars with moist earth and kept at temperatures of 45°–50°F.)

Six species of ants were observed to take gravid segments of *R. tetragona* into their nests. Although the ants were not proved to act as intermediate hosts, the authors suggest that this is a possibility to be considered.—C. V. WATKINS.

*BISBOCCI, G. (1940). Cysticercus cellulosae Rud. nel cuore di un cane. [*C. cellulosae* **in the Heart of a Dog**].—*Riv. Parassit.* **4.** 117–124. [Abst. from abst. in *Zbl. Bakt. I.* (*Ref.*). **139.** 488].

Description of a case in a seven-year-old bitch, whose myocardium contained about 30 small cysticerci which varied from the size of a millet seed to that of a pea. Similar cases in the literature are cited.

I. ROSE, H. M., & CULBERTSON, J. T. (1940). **The Diagnosis of Echinococcus (Hydatid) Disease by Immunologic Reactions with Substitute Taenia Antigens.**—*J. Amer. med. Ass.* **115.** 594–598.

II. CULBERTSON, J. T., & ROSE, H. M. (1941). **Further Observations on Skin Reactions to Antigens from Heterologous Cestodes in Echinococcus Disease.**—*J. clin. Invest.* **20.** 249–254.

I. Casoni's cutaneous test and the Ghedini-Weinberg complement-fixation reaction have not been much used for the diagnosis of hydatid disease in the U.S.A., because the hydatid fluid utilized as antigen is generally difficult to obtain in that country. Since both reactions are group specific rather than species specific [see CHUNG & T'UNG—*V. B.* **10.** 273.], substitute antigens have been prepared from other cestodes which are readily available.

Cutaneous tests were performed on 14 echinococcosis patients by injection of saline extracts of *Cysticercus pisiformis* and *Taenia taeniaeformis*. Strongly positive reactions were obtained in ten cases, five with *C. pisiformis*, three with *T. taeniaeformis*, and two with both antigens. Moderate reactions were obtained in one case with *C. pisiformis* and in another with *T. taeniaeformis*. The reactions were negative in the remaining two cases tested with *T. taeniaeformis*; in both cases, however, the hydatid cysts were calcified.

In seven of these 14 patients, in whom comparative tests were made with hydatid fluid as antigen, the reactions were less vigorous than those obtained with *C. pisiformis*. No response was obtained in 45 hydatid-free patients used as controls.

In complement-fixation tests made on seven other cases of hydatid disease, the antigens comprised a saline extract of *T. taeniaeformis*, and hydatid fluid from pig, sheep, and man. The results from *T. taeniaeformis* antigen were comparable with those from pig hydatid fluid and were superior to those found with the other

two hydatid antigens. Anti-complementary action was not observed with any of the antigens.

II. Saline extracts of the following helminths were used for skin tests on patients with echinococcus disease :– *Echinococcus granulosus* (cyst membranes), *Taenia saginata, T. pisiformis, Hymenolepis fraterna, Moniezia expansa, Raillietina cesticillus, Diphyllobothrium mansonoides* from the cat and *Sparganum mansonoides* from the monkey, and a protein-free polysaccharide derived from *T. taeniaeformis*. Intracutaneous injection of all the undiluted extracts elicited immediate skin reactions in infected cases; some of the antigens tolerated much greater dilution than others before becoming ineffective. These antigens also yielded skin reactions in normal persons sensitized locally with serum from patients with hydatid disease (Prausnitz-Küstner tests). No immediate reaction was observed in normal controls, although a slight oedema occurred with undiluted *T. saginata* and *H. fraterna* extracts, but there was no response when the antigens were diluted 1 : 5. Suitable antigens occurred in greatest amounts in cestodes closely related to *E. granulosus* and proportionately less in distantly related forms. The homologous hydatid membrane was extremely poor in such antigens.—M. L. Bingham.

Hökl, J., Cervinka, F., & Klauz, A. (1940). Beitrag zur Feststellung der Verbreitung der Trichinose bei Menschen und Tieren. **[Trichinosis in Man and Animals in Moravia].**—*Z. Fleisch- u. Milchhyg.* **50.** 112.

Trichinae were not found in any of 198 dogs, 40 cats, or 459 human beings examined P.M. at Brno.—J. E.

I. Queen, F. B. (1939). **The Diagnosis of Trichinosis by the Digestion Method.**—*Amer. J. clin. Path.* **9.** 209–218.

II. Schwartz, B. (1941). **Requisites for a Practical Intracutaneous Test for the Detection of Trichina Infection in Swine.**—*J. Amer. vet. med. Ass.* **99.** 465–467.

III. Beeson, P. B. (1941). **Trichiniasis. Clinical Manifestations and Diagnosis.**—*Lancet.* **241.** 67–69.

IV. Vida, B. L. D., & Dyke, S. C. (1941). **Blood Picture in Trichiniasis.**—*Ibid.* 69–71.

I. Q. discusses the various laboratory procedures which may aid the diagnosis of trichinosis, with special reference to the digestion of muscle as well as meat products by artificial gastric juice. The digestion method is four times more accurate than a modified serial section method, and three times more accurate than the compression method. Histological examination is of value in the interpretation of the results of the digestion method, which may reveal a few cysts in an old infection, but will not indicate clinical trichinosis. The presence of myositis in sections helps to confirm a recent clinical infection.

II. S. discusses measures for the control of human trichinosis, namely, microscopic inspection of pork for *Trichinella*, cooking of garbage before feeding to swine, and skin or other biological tests. Microscopic examination, although widely used in Europe, has not been developed in the U.S.A., but some protection against infection is provided for the public by the compulsory heating or other prescribed treatment of all pork products which are normally eaten uncooked. The sterilization of garbage, although not primarily introduced against trichinosis, appears to be a very useful control measure. Considerable experimental work on the value of intracutaneous tests as a routine measure has shown that antigens of various types prepared from trichina larvae do not possess the high degree of specificity required for the diagnosis of swine trichinosis and at present the use of such tests would tend to create a false sense of security.

III. B. reviews the clinical manifestations of trichinosis as observed in the recent outbreaks in human beings in England, and stresses the extreme variations in symptoms and severity of the disease. The detection of eosinophilia was found to be the best guide to diagnosis. Other methods of diagnosis included isolation of larvae from the blood during the first 3–4 weeks of infection and from certain muscles after the third week, and the demonstration of specific antibodies by means of a skin or precipitin test. Although the intradermal test is very valuable in selected cases, a positive response may also be exhibited for several years after an infestation. Occasionally agglutinins to *Salmonella typhi* are developed during the acute stages of the disease. B. concludes that radiography is of no value in the detection of calcified trichina cysts in muscle tissue.

IV. A study of the blood in about 100 cases of trichinosis revealed a leucocytosis immediately after the appearance of symptoms, which reached its peak at about the third week and, after a decline to normal, reached a secondary peak at the 11th week. Eosinophilia developed about a week after the onset of symptoms and then closely followed the fluctuations in the leucocyte count. The neutrophiles followed a course inverse to that of the eosinophiles. An increase in lymphocytes was noticed at about the fifth week, reaching its peak at about the 11th week. Monocytes increased with the first decline in the eosinophilia. In the early stages of infection many polymorphs contained eosinophilic as well as the typical neutrophilic granules.—M. L. B.

I. Davis, E., & Allott, E. N. (1941). **Trichiniasis in South-East London.**—*Lancet.* **241.** 396–397.

II. Houston, J. C., & Ross, L. (1941). **Trichiniasis with Cerebral Symptoms. Report on Two Cases.**—*Ibid.* 397–398.

I. An outbreak of trichinosis which occurred amongst members of a fire-station and a group of neighbours is recorded, discussed, and analysed. Only 13 persons out of the 42 known to be exposed to trichinosis showed the full clinical picture of the disease, although 26 persons developed symptoms; there was one death. All the cases were traced to a single supply of sausages.

II. The authors detail the clinical findings in the two most severe cases occurring in the outbreak of trichinosis described in I. Each case showed special features and in one case, which ended fatally, embryos were detected in the blood and, at autopsy, a larva was demonstrated in the tendinous portion of the diaphragm.—J. N. O.

*Schoene, W. (1938). Die Verbreitung der Strongylidenarten bei Militärpferden im Standorte Hannover und Versuche zur Klärung des Wanderungsweges ihrer Larven im Tierkörper. **[Incidence of Strongyles in Military Horses at Hanover, and Attempts to Follow the Migration of the Larvae].**—*Inaug. Diss., Hanover.* [Abst. from abst. in *Zbl. Bakt. I.* (*Ref.*). **136.** 181].

All of 200 horses examined were infested with strongyles. Ascarid eggs were found in 26% and cestode eggs in 4·5%. Of 182 of these horses, 89% were infested with *S. vulgaris*, 57% with *S. equinus*, 56% with *S. edentatus*, and 99·5% with *Trichonema* spp. Of 174,993 larvae identified as to species *S. vulgaris* accounted for 16·22%, *S. equinus* for 6·75%, *S. edentatus* for 5·75%, and *Trichonema* spp. for 71·30%.

Unsuccessful attempts were made to clarify the route of migration of strongyle larvae by feeding them to four white mice and one g. pig. In only one case was a larva found in the mesentery.—A. L. Wilson.

*ERSHOV, V. S. (1939). **[Alfortiosis (*Strongylus edentatus* Infestation) in Horses].**—*Trud. Kirov. zootekh.-vet. Inst.* **4.** 49–68. [In Russian]. [Abst. from abst. in *Zbl. Bakt. I.* (*Ref.*). **139.** 493].

Peritoneal *S. edentatus* infestation occurs in horses of various ages, even as young as 40 days ; caecal infestation occurs from the age of seven months onwards. E. found that peritoneal infestation with 8–71 larvae in foals up to a year old, or with 78–205 larvae in older animals, might prove fatal ; smaller numbers of larvae provoked only clinical manifestations. Mortality is highest in foals 5–10 months old, diminishing steadily in older animals ; in horses 2–10 years old mortality is relatively low, but thereafter it increases considerably. The greatest mortality occurs in spring (February-May inclusive) and autumn (August-December). The largest numbers (81·7%) of worms were found in the caeca of affected animals. Details and statistical data are given of the districts in Russia where the infestation is heaviest.

SHUMAKOVICH, E. E. (1938). Ostertagia mongolica—novaya nematoda ovets, koz, verblyudov i antilop. **[*O. mongolica*, a New Nematode of Sheep, Goats, Camels, and Antelopes].**—*Trud. vsesoyuz. Inst. Helmintol.* **3.** 203–204. Moscow : Sel'khozgiz.

The description is given of the male and female of a new species of *Ostertagia* which belongs to the subgenus *Marshallagia*, and which differs from the only species known, *O.* (*Marshallagia*) *marshalli*, in the structure of the spicules. *O. mongolica* has been found in Mongolia in the abomasum of sheep, goats, camels, and antelopes. —A. MOLDAWSKY.

I. SHIBAEV, L. P., MONINA, E. F., & SOPEL'CHENKO, M. I. (1936). K voprosu o biologii Dictyocaulus filaria v usloviyakh Uzbekistana. **[Biology of *Dictyocaulus* under Uzbekistan Conditions].**—*Trud. Uzbek. nauchn.-issled. vet. Stan., Tashkent.* **7.** 4–16. [English summary].

II. SHIBAEV, L. P., SOPEL'CHENKO, M. I., & SHMELEV, A. F. (1936). Opyt organizatsii profilaktiki diktiokauleza ovets v odnom iz kosheĭ karakulevodcheskogo sovkhoza Uzbekistana. **[Control of *Dictyocaulus* on the State Karakul Sheep Farm, Uzbekistan].**—*Ibid.* 17–26. [English summary].

III. SHIBAEV, L. P. (1936). Opyt terapii diktiokauleza ovets intratrakheal'nymi in'ektsiyami kreolina. **[Treatment of *Dictyocaulus* Infestation of Sheep by Creolin].**—*Ibid.* 27–50. [English summary].

IV. KULAKOV, K. A. (1936). Izmeneniya v organakh ovets pri intratrakheal'nykh in'ektsiyakh kreolina. **[Histological Changes in Organs of Sheep after Intratracheal Creolin Injection for Treatment of *Dictyocaulus* Infestations].**—*Ibid.* 51–67. [English summary].

I. Experiments were conducted to determine the resistance of *D. filaria* larvae to freezing, desiccation, high temperatures, and the action of disinfectants and drugs under the specific climatic conditions of a hot desert region in Uzbekistan.

II. A description of a pasture rotation experiment, involving 3,800 sheep. The object was to discover those methods of *Dictyocaulus* control best adapted to conditions on a sheep farm in Uzbekistan. The main conclusion drawn is that pasture rotation at ten-day intervals is indicated in the autumn and winter, while in summer it is of little importance, owing to the rapid destruction of the larvae by the heat.

III. S. examined the therapeutic effect of intratracheal injections of creolin and concluded that creolin is not as effective as iodine in the treatment of lungworm infestations.

IV. A histological study of the irritant and toxic effects of intratracheal injections of creolin in *Dictyocaulus* infestation of sheep.—E. MARTIN.

BOEV, S. N., & VOL'F, Z. V. (1938). Novyĭ hel'mint legkikh ovets Synthetocaulus schulzi n.sp. **[*Protostrongylus* (*Synthetocaulus schulzi*) n.sp., a Lungworm from Sheep].**—*Trud. vsesoyuz. Inst. Helmintol.* **3.** 144–147. Moscow : Sel'khozgiz.

The description is given of the male and female of a new nematode from the lungs of sheep, which occurs only in various districts of South Kazakhstan, Russian Turkmenia. Differential diagnosis from other species of *Protostrongylus* is described.—A. MOLDAWSKY.

*PENSO, G. (1940). Contributo allo studio della cancerogenesi sperimentale du vermi. **[Experimental Study of the Carcinogenic Action of Helminths].**—*R. C. Ist. Sanit. pubbl., Roma.* **3.** 337–362. [Abst. from abst. in *Zbl. Bakt. I.* (*Ref.*). **139.** 75].

P. observed the presence of a sarcoma in the liver of a rat experimentally infected with *Cysticercus fasciolaris*, and of a lymphoma in a mouse experimentally infected with *Muspicea borreli* [Filaroidea]. These tumours are described in detail. Finally, P. mentions a cancer observed in the stomach of a rat infected with *Gongylonema neoplasticum*.

DISEASES, GENERAL

—. (1941). **Discussion on the General Principles Involved in a Campaign to Control Certain Diseases of Cattle Inimical to Man.** [Speakers : STEELE-BODGER, H. W., BARKER, J. R., GOULD, G. N., BOSWORTH, T. J., EDWARDS, S. J., PARISH, H. J., OAKLEY, C. L., DUNLOP-MARTIN, G., REID, H. A., WOOLDRIDGE, W. R., MCEWEN, A. D., ALSTON, J. M., STABLEFORTH, A. W., EDWARDS, J. T., & MATTHEWS, H. T.]—*Proc. R. Soc. Med.* **35.** 115–122.

This is the report of the first of a series of discussions dealing with the general principles involved in the control of certain major diseases of cattle in temperate climates. Among the subjects briefly touched on by the various speakers were : the financial losses resulting from disease in dairy herds, the difficulties encountered in the eradication of contagious abortion and whether this disease could best be controlled by the test-and-slaughter policy or by vaccination methods, the transmission of milk-borne diseases to man and the value of pasteurization, the importance of good animal husbandry and hygiene, and the National Veterinary Medical Association's scheme for the control of mastitis, contagious abortion, and infertility in cattle. The discussion proceeded on very general lines ; the principles involved in the control of such diseases of dairy cattle were not dealt with in any detail.—N. J. SCORGIE.

BALTZER, A. C. (1940). **Causes for Cow Removals in Michigan Herds under Test in Dairy Herd Improvement Associations.**—*Quart. Bull. Mich. agric. Exp. Sta.* **22.** 147–153.

A statistical survey of the causes of wastage of cows in Michigan herds during the years 1931–39 inclusive shows that 25,449 of a total stock of 105,258 cows were removed. Of these 5,441 were sold in healthy condition for dairy purposes. The others were removed for the following reasons :—low production, 10,451 (52%) ; udder troubles, 2,486 (12%) ; bovine brucellosis, 2,434 (12%) ; sterility 1,350 (7%) ; premature death, 1,287 (6%) ; old age, 624 (3%) ; bloat, 140 (1%) ; other

reasons, 1,236 (6%). Emphasis is laid on the fact that removals due to udder trouble, sterility, and brucellosis were together considerably less than those due to low production. Suggestions are made to reduce losses from the latter cause.—D. D. OGILVIE.

I. ROWSON, L. E. A. (1942). **Sterility in Cattle Due to Bursitis and Salpingitis.**—*Vet. Rec.* **54.** 74–75.

II. EDWARDS, W. P. S. (1942). **Sterility in the Mare: Treatment by the Fallopian Tube Insufflator.**—*J. R. Army vet. Cps.* **13.** 56–58.

I. P.M. examination of the uteri of 296 cows showed various degrees of adhesions in the ovarian bursa in 40 cases. In 13 of these the condition was very severe and reproduction was impossible. The technique of examination of the ovarian bursae in the live animal is described.

Tentative attempts to test the patency of the Fallopian tubes in live animals by insufflation were abandoned, since in experiments with excised uteri rupture of the organ occurred in about 25% of cases.

II. The results of field trials with a modified human-pattern Fallopian tube insufflator in the mare are described. The treatment was of no value for diagnosis or correction of tubal occlusion.—D. D. OGILVIE.

*SEEKLES, L. (1940). Die chemischen Aenderungen des Blutserums bei Toxämien des Rindes. **[Chemical Changes in the Blood Serum in Toxaemias in Cattle].**—*Tierärztl. Rdsch.* 355–358. [Abst. from abst. in *Zbl. Bakt. I.* (*Ref.*). **139.** 334].

The disease conditions considered are intoxications following metritis, pyometra, Johne's disease, and the gastro-intestinal form of foot and mouth disease. In the last disease there was a fall in the average serum calcium value, a slight lowering of the average magnesium value, and an increase in the average content of inorganic phosphate, although considerable variations in these values were given by the various serum tests; there was also considerable variation in residual nitrogen, chlorine, and cholesterol. In the remaining toxaemias studied, the mineral content of the blood serum showed close relationship with the findings in the gastro-intestinal form of F. & M. disease.

THORP, W. T. S., SHIGLEY, J. F., & FARREL, M. A. (1942). **Some Factors Affecting the Incidence of Calf Scours.**—*Vet. Med.* **37.** 34–35.

A report is given of cases of calf scours occurring over a period of 2½ years among 362 calves in a large dairy herd. In a group of 15 calves which sucked at will for 3–4 days after birth, scours developed in 12 and three died. In another group of 21 calves which were removed from their dams 24 hours after birth and received only 4–6 lb. of milk per day thereafter, scours developed in only six cases, one of which was fatal. A specific serum prepared by immunizing cows with three strains of coliform organisms from acute cases of infection was successful in the newborn calves.

—D. D. OGILVIE.

RUBARTH, S., & HENRICSON, T. (1941). Mögelförgiftning åtföljd av infektion med Bacterium viscosum equi och streptokocker hos äldre hästar. **[*Bact. equirulis* and Streptococcal Infections in Aged Horses following Mouldy Fodder Poisoning].**—*Svensk Vet-Tidskr.* **46.** 97–107. [German summary].

Cases of infection with *Bact. equirulis* and streptococci, following mouldy fodder poisoning, were observed in horses. All seven horses on one farm died within a week. Examination revealed ulcerative stomatitis, pseudo-membranous pharyngitis, and enteritis, but the most marked feature was the number of haemorrhages, especially subperitoneal. Bacteriological examination showed general infection with *Bact. equirulis* and streptococci of Lancefield's group C. In another case, an 18-year-old horse had shown progressive wasting; the same changes were demonstrated as in the other horses, but in addition there were centres of leucocytic nephritis. Bacteriological examination showed general infection with *Str. equi*, and *Bact. equirulis* infection in the kidneys.

Examination of the straw fed, and of the intestinal contents and the necrotic pharyngeal membranes, revealed the presence of *Aspergillus fumigatus*, and evidence is adduced to show that the inflammatory changes produced by the fungus assisted invasion by the bacteria.

SEEKLES, L. (1941). Graskrankheit und Futtervergiftung beim Pferde im Zusammenhang mit dem Problem der Selbstvergiftung der grossen Haustiere. **[" Grass Sickness " and Food Poisoning of Horses in Relation to Auto-Intoxication of the Larger Domestic Animals].**—*Tierärztl. Rdsch.* **47.** 66–69, 77–81, 93–95 and 105–107.

A speculative general article, with no new data, in which " grass sickness " [of Scotland], laminitis, periodic ophthalmia and myoglobinuria of horses, " forage poisoning " of horses and cattle, and " milk fever " and grass tetany [or lactation tetany] in cows, are all discussed in relation to possible auto-intoxication from the alimentary tract. Those interested in following the obscure physiological argument and somewhat far-fetched correlations, should consult the original.

—H. H. GREEN.

STEWART, A. B. (1941). **Soil Properties in Relation to the Occurrence of Grass Sickness in Horses.**—*J. agric. Sci.* **31.** 308–319.

During the summer of 1938, representative samples of the top 2 in. of soil, of the surface soil down to ordinary cultivation depth, and of subsoil (9–18 in.) were taken from the fields of 63 Aberdeenshire farms on which cases of " grass sickness " had recently occurred. S. discusses the geological origin and texture of the soils, and the acidity, base status, and certain of the inorganic constituents (plant foods) of the samples; the trace element values are to be recorded later. Almost all the samples examined were classified as acid soils, which required liming from the general agricultural viewpoint, and it is suggested that it would be of value to determine whether or not " grass sickness " occurs to an appreciable extent on limestone soils or on systematically limed soils of about pH 7. There was no other finding which suggested any connexion between soil properties and the occurrence of the disease.—ALASTAIR N. WORDEN.

*RIVERUD, O. (1941). Lungesyke hos hesten. **[" Lung Sickness " in Horses].**—*Norsk VetTidsskr.* p. 126. [Abst. from abst. in *Skand. VetTidskr.* **31.** 309–311].

In six months R. observed 90 cases of the condition here designated " lung sickness "; symptoms were high temperature, inappetence, weakness, accelerated pulse and respiration, and yellowing of the conjunctiva and buccal mucosa; a weak cough and presence of mucus in the drinking trough were characteristic. The disease was highly infectious, the incubation period being three weeks. Two untreated animals died, and P.M. examination showed characteristic symptoms of croupous pneumonia. Treatment with prontosil proved ineffective, but prompt injection of 3 g. of neosalvarsan brought about recovery in ten days.

NICKEL, R., & GISSKE, W. (1941). Blut- und Lymphgefässsystem des Darmes als Infektionspforte. **[The Blood and Lymphatic Systems of the Intestines as**

Routes of Infection].—*Z. Fleisch- u. Milchhyg.* **51.** 225–227, 239–241 and 257–259. [pp. 239–241 are unobtainable and are not included in this abst.]

The authors refer briefly to the results of a series of 16 experiments designed to discover the factors influencing the permeability of the small intestine to certain pathogenic organisms and the route taken by these organisms after penetration.

Normally bacteria penetrate the bowel wall in small numbers, but when organisms of the salmonella group were injected by capillary tube (dose not recorded) into the duodenum of piglets, they were detected in the mesenteric veins 5, 10, and 15 min. afterwards. Fewer organisms were detected in the blood at the last examination than at the first, indicating that the rate of penetration rapidly fell.

According to the findings of the authors, such bacteria pass through the intestinal wall into the lymph capillaries and also the capillaries of the portal system thus reaching the liver *via* the portal vein. Many reach the lymphatic network of the liver and, if not phagocytosed by the Kupffer cells, pass to the group of portal lymph nodes and into the general circulation. Organisms injected into the jugular vein are held up by the liver which is the body's first line of defence and is endowed, through its Kupffer cells, with considerable bacteriolytic powers. Such organs as the lungs, spleen, kidneys, and adrenal bodies seem to possess this power to a very low degree.

The resistance of the intestinal wall to the penetration of bacteria is decreased by the existence of any diseased condition of the bowel itself, either local or general, by the general raising of the body temperature, such as occurs in a fever or when the external temperature is raised unduly and in bodily exhaustion, starvation, or fatigue.—N. S. Barron.

Hogan, A. G., Muhren, M. E., & Bogart, R. (1941). **A Hemophilia-Like Disease in Swine.**—*Proc. Soc. exp. Biol., N.Y.* **48.** 217–219.

A preliminary report is given of a disease which has occurred during the last few years in pigs which have died from haemorrhage, either spontaneous or as a result of minor wounds. All the affected animals were closely related and the symptoms resembled haemophilia more closely than any other disorder. Investigation of the blood-clotting mechanism showed that the coagulation time was five times that of normal blood and indicated that the blood platelets from defective animals were abnormally stable and that the level of thromboplastin was lower than that in normal animals.

—R. Allcroft.

NUTRITIONAL AND METABOLIC DISORDERS

Stewart, J., Mitchell, R. L., & Stewart, A. B. (1942). **Pining in Sheep: II. Confirmatory Experiments on its Control by Cobalt-Rich Fertilizers.**—*Emp. J. exp. Agric.* **10.** 57–60. [For previous part, see *V. B.* **12.** 167].

In Easter Ross, where pining occurs among sheep, two fields manured with superphosphate and sulphate of ammonia were each divided into two, and one half of each received Co manurial treatment at the rate of 2 lb. $CoCl_2.6H_2O$ per acre. A group of young lambs with their mothers was allowed to graze the treated areas and controls grazed the untreated portions of the fields. After about four months the Co-treated group had gained an average of 22 lb. per head more than the control group, the results being statistically highly significant. Analyses of the acetic acid soluble Co content of the soils of the herbage showed more Co in the treated areas. Analyses are also given of other experimental plots treated with different amounts of Co as fertilizer; corresponding amounts were present in the soil and herbage. The authors emphasize the necessity of proving a soil Co deficiency before manurial treatment with Co is undertaken, since "pining" in lambs may be due to several causes of which Co deficiency is only one.—Alfred Eden.

Light, R. F., & Frey, C. N. (1941). **Bone Fractures Due to Low Calcium Diets.**—*Proc. Soc. exp. Biol. N.Y.* **48.** 256–258.

X-ray examination of four of eight weaned rabbits which died suddenly after 3–8 weeks on a diet adequate in vitamin D and P but low in Ca (0·2%), showed that one or more vertebrae had been fractured and had collapsed in each instance. Litter mates fed the same basal diet plus 1% $CaCO_3$ remained normal throughout the experimental period and showed normal, well developed vertebral columns. It is stated that a diet low in Ca but otherwise adequate will produce in young growing animals a skeletal structure which is hard but light and fragile, thus giving rise to spontaneous fractures.—R. Allcroft.

Marek, J., Wellmann, O., & Urbányi, L. (1941). Untersuchungen über den Mineralstoffwechsel des tierischen Organismus. I. Mitteilung. Beeinflussung des Stoffwechsels im Ferkelkörper durch ein Futter mit verschiedener mineralstofflicher Zusammensetzung bei verschiedener Kalkergänzung. II. Mitteilung. Beeinflussung des Stoffwechsels durch eine phosphor- bzw. eine kalküberschüssige Fütterung bei Ferkeln. **[Investigations on Mineral Metabolism of the Animal Body. I. Effect on the Metabolism of Piglets of Food Containing Variable Amounts of Minerals with Varied Calcium Supplements. II. Effect on Metabolism of Piglets of Excessive P or Ca].**—*Arch. wiss. prakt. Tierheilk.* **76.** 387–399 and 400–406.

I. Apparently the first of a fresh series of observations along lines followed by the senior author and his colleagues over the last 20 years [see *V. B.* **1.** 261 and **11.** 891]. Balance experiments over six days were carried out during three periods of 4–5 weeks on six young pigs (6–8 weeks old), paired in three groups on rations high, moderate, and low in P content, and of E.A. values varying from −5 to +25 [see note below]. P content was varied by varying the proportions of maize, barley, bran and meat meal in the ration, and Ca content by supplements of $CaCO_3$. In general a ration low in P and crude fibre gave better weight increases than one high in P and crude fibre. Raising the E.A. in the case of the P-rich ration by addition of $CaCO_3$ diminished weight gains and food utilization, and did not improve gains in the case of the rations of moderate and low P content, but favourable influence was shown by moderate addition in some cases. The relative excretion of nitrogen, dry matter and minerals in faeces and urine was influenced by the relative proportions of Ca and P in the rations; utilization of food, as well as the significance of the E.A. value, was also affected by the age of the animals, the quantity of dry matter, and the total Ca and P content. The results however, are not clear-cut.

II. Four eight-week-old pigs were fed for three months on a ration of maize, barley, bran and flesh meal, with adequate salt and additions of Na_2HPO_4, $CaHPO_4$, and $CaCO_3$ to vary the E.A. value from −80 to +80 and the Ca : P ratio from 0·77 to 3·94. At the end of the

period a six-day balance experiment was included, dry matter, N, Ca, Mg, and P being determined in food, faeces, and urine. At slaughter the skeleton was examined for evidence of rickets, and analyses of fat-free bones were made. One-sided nutrition in respect of either Ca or P disturbed the acid-base equilibrium and led to rickets. Excess of P over Ca increased the elimination of P in urine and of water, dry matter, N, Ca, and Mg in faeces. Excess of Ca over P operated in the opposite direction.

[E.A. stands for *Erd-Alkalizität* or "alkalinity in respect of earthy bases", and indicates the proportion of CaO+MgO in relation to P_2O_5. The numerical value of E.A. is obtained by adding the "milligram equivalents" of CaO and MgO in the food, subtracting the "milligram equivalents" of P_2O_5 and expressing the difference "per 100 g. dry matter". To the abstractor E.A. is a confusing concept and a critique of its significance has already been given in *Vet. Rec.* **51.** 508–512. With regard to the two papers above, any brief abstract can only be obscure to the general reader, and workers in the particular field of mineral metabolism should study the original protocols in detail and form their own impression of the value of the authors' conclusions.]—H. H. Green.

*Kirsch, W., & Jantzon, H. (1941). Ueber Rachitisentstehung und -verhütung bei der Verfütterung von Walfleischmehl an Schweine. **[Cause and Prevention of Rickets in Pigs Receiving Whale Flesh Meal].**—*Biederm. Zbl.* **13.** 180–188. [Abst. from abst. in *Tierärztl. Rdsch.* **47.** 374].

To investigate whether whale-flesh meal which has a high protein content could be used as a substitute for fish meal or other protein concentrates, an experiment was made with four groups of pigs receiving barley and potatoes as basal diet with supplements of fish meal, whale-flesh meal, whale-flesh meal plus irradiated yeast and phosphate, or a proprietary protein concentrate. After about 20 days the pigs receiving the whale-flesh meal without any supplement showed stiffness, swellings of the limbs, and other rachitic signs. These symptoms were prevented by the presence of irradiated yeast and phosphates and the condition could be cured by supplements containing vitamin D and phosphate. Thus whale meal was only satisfactory if it was supplemented with vitamin D and phosphate and if it was given to supply a higher level of protein than is usually given with fish meal. The proprietary concentrate tested in these experiments was not very satisfactory.—A. M. C.

Cox, A. J. (1941). **Site of Vitamin A Storage in the Liver.**—*Proc. Soc. exp. Biol., N.Y.* **47.** 333–335.

Chloroform extracts of different portions of the livers from three human cases of healed massive necrosis were examined by means of the antimony trichloride reaction. Greater quantities of vitamin A (approximately 250–500 I.U. per g.) were present in those portions in which the hepatic cells had been destroyed than in those areas in which the tissues were intact (approximately 125 I.U. per g.). It is thus inferred that vitamin A storage had taken place in the undamaged Kupffer cells.—A. N. W.

Phillips, P. H., Lundquist, N. S., & Boyer, P. D. (1941). **The Effect of Vitamin A and Certain Members of the B-Complex upon Calf Scours.**—*J. Dairy Sci.* **24.** 977–982.

It is claimed that "scours" [bacteriological data not given] in the young calves of one Jersey and one Holstein herd were successfully treated by the administration of shark liver oil together with capsules containing vitamin B_1, riboflavin, pantothenic acid, choline, and nicotinic acid. Shark liver oil therapy alone was not completely successful, and it is suggested that ruminal synthesis of the B vitamins may be inadequate in the newly born calf.

Estimations carried out on the blood plasma of 15 newly born calves showed high ascorbic acid values (mean, 0·53 mg. per 100 ml.) and low vitamin A (4 μg. per 100 ml.) and carotene (5 μg. per 100 ml.) values. All three values showed a marked movement towards the normal within 24 hours of birth.—A. N. Worden.

Herschel, A. (1939). Onderzoekingen over E-avitaminose. **[Research on Avitaminosis E].**—*Tijdschr. Diergeneesk.* **66.** 402–410.

H. describes his investigations into the vitamin E contents of some animal fodders, as determined by rat feeding experiments.

The vitamin E content of hay varied with conditions at the time of haymaking. Rats reproduced normally when their diet, otherwise free from vitamin E, contained at least 15% of chopped good quality hay, or 3% of ground rapidly dried grass. H. concludes that the loss of vitamin E during ordinary haymaking amounts to 60–80%.

8% linseed meal in the ration proved insufficient as the sole source of vitamin E, as did 10% of maize meal.

Hair changes in albinos, retardation of body growth, and disturbances of lactation, all of which have been observed in rats fed on synthetic vitamin E free diets and ascribed to a deficiency of this vitamin, are, in H.'s opinion, probably due to a co-existing deficiency of cystine and isoleucine in such diets.

As a therapeutic agent for the treatment of sterility not attributable to any obvious cause H. administered vitamin E in the form of wheat germ oil to 63 cows and mares; 25 ml. were given intramuscularly on the day of mating, and the same amount 8–10 days later. 70% of the animals treated gave birth to living offspring.

From his observations that a large dose of vitamin E, when given to rats deprived of vitamin E produced temporary cessation of oestrus, H. tentatively concluded that the vitamin might favour the production of progesterone. On this assumption he treated an unstated number of cows with nymphomania with a single intramuscular injection of 50 ml. of wheat germ oil, combined with expression of any ovarian cysts present. Cows so treated settled down quickly, their pelvic ligaments gradually returning to normal. Some of these cows, however, did not conceive when subsequently mated. —M. Landau.

Goettsch, M., & Pappenheimer, A. M. (1941). **α-Tocopherol Requirement of the Rat for Reproduction in the Female and Prevention of Muscular Dystrophy in the Young.**—*J. Nutrit.* **22.** 463–476.

Natural α-tocopherol, synthetic *dl*-α-tocopherol, and synthetic *dl*-α-tocopherol acetate were found to be equally efficacious in standard tests based on the cure of infertility and on the prevention of muscular dystrophy due to vitamin E deficiency. A single dose of 2·5 mg. α-tocopherol at the beginning of the gestation period permitted the birth of living young to at least 85% of the deficient females, and a single dose of 0·5 mg. at the 15th–17th day of lactation prevented muscular dystrophy in at least 85% of the young of suitably prepared females. Oral administration was found to be much more effective than either subcutaneous or intramuscular injection.—Alastair N. Worden.

Pappenheimer, A. M., Goettsch, M., & Schogoleff, C. (1941). **Death of Embryos in Guinea Pigs on Diets Low in Vitamin E.**—*Proc. Soc. exp. Biol., N.Y.* **47.** 268–270.

Small quantities (25 g. daily) of fresh lettuce leaf were added to a basal vitamin E deficient diet in order to provide the "grass juice factor" which appears to be

essential for g. pigs [see KOHLER *et al.*, p. 390]; this did not provide sufficient vitamin E to prevent the onset of muscular dystrophy in animals not receiving supplements of α-tocopherol.

In three female g. pigs which received 5 mg. α-tocopherol weekly, in addition to the above diet, vaginal haemorrhage occurred 27–30 days after successful mating [*i.e.*, almost half-way through the gestation period] and in each case laparotomy revealed dead or partially resorbed foetuses. The addition of 10 mg. α-tocopherol weekly appeared to confer some degree of protection on two other females.—A. N. WORDEN.

*DYNNA, O., & THUNE, I. (1941). B_1 avitaminose hos kua. [**Avitaminosis B_1 in Cows**].—*Norsk VetTidsskr.* **53.** 94–96. [Abst. from abst. in *Tierärztl. Rdsch.* **47.** 374].

Vitamin B_1 deficiency is reported in young cattle up to two years of age. The animals stood with sagging backs and showed spasticity with stiff, ataxic gait. The heart was irregular and there was occasionally tympanites. In severe cases the animals lay down with outstretched limbs. Treatment with vitamin D and calcium was useless, but administration of 800 I.U. of vitamin B_1 intravenously or by mouth for 5–8 days produced recovery even in bad cases.—A. M. COPPING.

SHAW, J. H., & PHILLIPS, P. H. (1941). **The Pathology of Riboflavin Deficiency in the Rat.**—*J. Nutrit.* **22.** 345–358.

Two basal synthetic diets were used to produce riboflavin deficiency in young male albino rats. The diets were isocaloric, but one contained large amounts (39%) of fat, whereas the other was rich in carbohydrate. In both cases control animals receiving 100 μg. riboflavin per day remained normal.

The deficiency symptoms and lesions included loss of weight; some loss of hair, and dermatitis; conjunctivitis, corneal opacity, and cataract (in two cases only); partial paralysis of the fore and hind legs, accompanied by myelin degeneration and occasionally by other changes in the peripheral nerves and spinal cord; testicular atrophy; early involution of the thymus, and in some cases degenerative changes in the thyroid and adrenals. The partial paralysis was much more readily produced in rats on the high-fat diet, and symptoms of deficiency generally appeared earlier in this group.
—ALASTAIR N. WORDEN.

ELVEHJEM, C. A. (1940). **The Biological Significance of Nicotinic Acid.**—*Bull. N.Y. Acad. Med.* **16.** 173–189.

A lecture, most of the relevant information in which, including that dealing with the relationship of nicotinamide to the coenzymes, has already been noted in the *Vet. Bull.* Of closely related pyridine derivatives, it appears that only those which are capable of conversion to nicotinic acid or nicotinamide *in vivo* are effective in combating canine blacktongue.—ALASTAIR N. WORDEN.

I. UNNA, K., RICHARDS, G. V., & SAMPSON, W. L. (1941). **Studies on Nutritional Achromotrichia in Rats.**—*J. Nutrit.* **22.** 553–563.

II. MUSHETT, C. W., & UNNA, K. (1941). **Inefficacy of Hormones in Nutritional Achromotrichia of Rats.**—*Ibid.* 565–571.

I. In experiments involving large numbers of both black and piebald newly weaned rats, it was shown that a conspicuous greying of the fur occurred in 3–7 weeks on a basal vitamin-B deficient diet supplemented by vitamins B_1, B_6, riboflavin, nicotinamide, and choline. The condition could be prevented and cured by the addition to the diet of 100 μg. daily of calcium pantothenate, while on this regimen black rats were successfully reared through three generations. Inositol, biotin and *p*-aminobenzoic acid were without effect, while the prophylactic and curative properties of liver and rice extracts were parallel with their pantothenic acid contents.

II. Anterior pituitary and adrenal cortex extracts and desoxycorticosterone acetate were without influence on the condition produced in the circumstances described in I.—ALASTAIR N. WORDEN.

FOUTS, P. J., HELMER, O. M., & LEPKOVSKY, S. (1940). **Nutritional Microcytic Hypochromic Anemia in Dogs Caused with Crystalline Factor I.**—*Amer. J. med. Sci.* **199.** 163–166.

Earlier experiments on puppies and pigs suggested that dietary deficiency of so-called "factor I", also termed "vitamin B_6" or "antidermatitis factor", produces anaemia. In the present experiments, three adult dogs were fed on a synthetic diet arranged as deficient only in factor I. Typical microcytic hypochromic anaemia developed, curable by oral or intravenous administration of this factor in crystalline form, but not curable by administration of Fe and Cu. High values for serum Fe throughout the experiments indicated that there was no lack of absorption of this element from the gastro-intestinal tract during the development of the anaemia.
—J. P. GARDNER.

PATRICK, H., BOUCHER, R. V., DUTCHER, R. A., & KNANDEL, H. C. (1941). **Biotin and Prevention of Dermatitis in Turkey Poults.**—*Proc. Soc. exp. Biol., N.Y.* **48.** 456–458.

Dermatitis in turkey poults may occur regardless of their riboflavin intake. In experiments involving more than 1,000 poults, supplements of biotin at a level of 40 rat units per day to an otherwise adequate diet prevented lesions; addition of 0·0005% riboflavin to the diet did not prevent dermatitis. Of a variety of other supplements tested, the residues from liver and yeast were the only ones to give complete protection; this property is ascribed to their biotin content.—F. D. A.

GAVIN, G., & MCHENRY, E. W. (1941). **The Effects of Biotin upon Fat Synthesis and Metabolism.**—*J. biol. Chem.* **141.** 619–625.

Pure biotin was found to replace the beef-liver extract hitherto shown by the authors to produce fatty livers in rats. Its effect was antagonised by simultaneous feeding of inositol, egg-white, or "lipocaic".—A. N. W.

FORBES, J. C. (1941). **Vitamin B Complex and Fat Metabolism.**—*J. Nutrit.* **22.** 359–364.

Fatty livers were produced in young rats of both sexes by feeding them on a fat-free, carbohydrate-rich diet containing 10% casein and supplemented by vitamins B_1, B_6, riboflavin, and calcium pantothenate. The further addition of nicotinic acid, at a level of 1,600 μg. per 100 g. food, is stated to have increased the cholesterol content of the fatty livers and to have rendered the liver lipids as a whole more resistant to the lipotropic action of choline.—ALASTAIR N. WORDEN.

MULFORD, D. J., & GRIFFITH, W. H. (1942). **Choline Metabolism. VIII. The Relation of Cystine and of Methionine to the Requirements of Choline in Young Rats.**—*J. Nutrit.* **23.** 91–100. [For previous parts, see *V. B.* **12.** 231–232].

The nutritive value, as judged by growth rate and food utilization, of a diet containing 18% casein was substantially improved for young male rats by the addition of 0·1–0·2% of either cystine or methionine. When the 18% casein diet was deficient in choline, however, the addition of this small quantity of cystine aggravated the lesions of choline deficiency, despite the increased growth

rate, but the addition of larger quantities of cystine was without further effect. The lesions of choline deficiency did not occur when the dietary casein was increased to 30%, indicating that sufficient methionine to prevent the deficiency had thus been supplied.—A. N. Worden.

Best, C. H. (1941). **The Significance of Choline as a Dietary Factor.**—*Science.* **94.** 523–527.

A review, most of the information in which has already appeared in papers abstracted in the *Vet. Bull.* [see Griffiths and others—*V. B.* **12.** 231–232]. Choline does not replace "lipocaic", the pancreatic extract which prevents the development of fatty livers in depancreatized dogs.—Alastair N. Worden.

Daft, F. S., Sebrell, W. H., & Lillie, R. D. (1941). **Production and Apparent Prevention of a Dietary Liver Cirrhosis in Rats.**—*Proc. Soc. exp. Biol., N.Y.* **48.** 228–229.

A preliminary report is given of the consistent and fairly rapid (46–111 days) production of liver cirrhosis in rats on a low protein, low fat diet with 0·5% cystine added but adequate in other constituents. A supplement of 20 mg. choline daily or addition to the diet of 0·7% of methionine, or an increase of the casein content of the diet from 4–30% prevented the appearance of any liver lesions in litter mates of the experimental animals after 90–140 experimental days.—R. Allcroft.

Charles, T. B., Gillespie, J. H., Durgin, R. C., & Martin, C. L. (1941). **Incidence of Gizzard Erosion.**—*Poult. Sci.* **20.** 447–449.

The gizzards of chicks hatched from eggs collected from 24 different sources were examined for lesions of gizzard erosion. Lesions were absent from only 28 out of 715 chicks. Although male birds showed a tendency to more severe ulcerations than females, there appeared to be no relationship between sex and the incidence of lesions.—F. D. Asplin.

Richardson, L. R., & Hogan, A. G. (1941). **The Anti-Perosis Complex.**—*Proc. Soc. exp. Biol., N.Y.* **48.** 459–461.

The experiments indicate that a factor in addition to manganese and choline, not identical with any of the recognized vitamins, is necessary to prevent perosis. A fuller's earth adsorbate at pH 1·0, and a 0·2 N ammonia eluate of the fuller's earth adsorbate of a watery extract of liver are fair sources of the factor. —F. D. Asplin.

Bell, T. A., Satterfield, G. H., & Cook, F. W. (1941). **"Leg Weakness" in Laying Hens on an Ascorbic Acid-Free (Vitamin C) Diet.**—*Proc. Soc. exp. Biol., N.Y.* **48.** 473–475.

Three out of 15 hens fed on a diet devoid of vitamin C developed weakness of one or both legs, inappetence, and loss of weight. Rapid recovery in all three followed subcutaneous injection of ascorbic acid in Ringer's solution. The authors believe that under the demands of heavy egg production, certain hens may develop avitaminosis C.—F. D. Asplin.

I. Kohler, G. O., Elvehjem, C. A., & Hart, E. B. (1938). **The Relation of the "Grass Juice Factor" to Guinea Pig Nutrition.**—*J. Nutrit.* **15.** 445–459.

II. Cannon, M. D., & Emerson, G. A. (1939). **Dietary Requirements of the Guinea Pig with Reference to the Need for a Special Factor.**—*Ibid.* **18.** 155–167.

I. Small quantities of various dried grasses, notably barley grass, were found to be capable of maintaining young g. pigs in health when added to a mineralized (+ Fe, Cu and Mn) winter milk diet which was otherwise incapable of supporting life. The active fraction was absent from a petroleum ether extract, but was present in the press juice obtained by centrifuging the whole grass pulp. It was therefore possible to maintain g. pigs in health on an entirely liquid diet, and it is suggested that absence of the "grass juice factor" may have been responsible for the failure of previous investigators to raise calves to maturity on a mineralized milk diet.

II. A factor apparently identical with that described in I was found to be present in lettuce leaves as well as in grass. The factor was apparently distinct from all known water-soluble vitamins.—Alastair N. Worden.

Almquist, H. J., & Mecchi, E. (1941). **Tryptophane Requirement of the Chick.**—*Proc. Soc. exp. Biol., N.Y.* **48.** 526–528.

Addition of pure *l*-tryptophane to a simplified diet containing 20% casein did not improve chick growth. In order to study the effect of lower tryptophane levels on chick growth the tryptophane of casein was removed by hydrolysis with strong sulphuric acid. Hydrolysed casein was then included in the simplified diet and graded amounts of *l*-tryptophane added. Maximum growth was attained with 0·5–0·6 g. of tryptophane per 100 g. of diet.—F. D. Asplin.

PHYSIOLOGY

Allison, J. B., Morris, M. L., Green, D. F., & Dreskin, H. O. (1941). **The Effects of Kidney Damage upon the Nitrogenous Constituents of Dog's Blood and upon the Specific Gravity of the Urine.**—*Amer. J. vet. Res.* **2.** 349–351.

Data are given which show that in dogs after a period of low fluid intake, a low specific gravity of urine correlated with a high blood urea nitrogen, is of clinical significance in detecting renal impairment. There is also an increase of the urea N : N.P.N. ratio in the blood in cases of kidney damage, but the increase in creatinine is not as uniform and is therefore not a reliable indication of the extent of renal damage.—R. Allcroft.

Smith, V. R. (1941). **In Vivo Studies of Hydrogen Ion Concentrations in the Rumen of the Dairy Cow.** —*J. Dairy Sci.* **24.** 659–665.

The pH of the ingesta of the rumen of two cows was measured electrometrically by inserting a glass electrode into the rumen through a rumen fistula. Fluctuations in pH were found to occur throughout the day, but these were not excessive; the pH was highest before feeding. Readings taken from the anterior part of the rumen were higher than those taken from the posterior part. The average figure obtained while the cows were fed on alfalfa hay alone was 6·27, while when beet pulp was fed in addition the average figure was 6·00.—A. T. P.

Trautmann, A., & Asher, T. (1941). Zur Frage der Celluloseverdauung. Weitere Beiträge zum Abbau der Cellulose im Blinddarm und Colon des Wiederkäuers. **[The Problem of the Digestion of Cellulose. The Breakdown of Cellulose in the Caecum and Colon of Ruminants].**—*Arch. wiss. prakt. Tierheilk.* **76.** 317–328. [See also *V. B.* **12.** 116].

Bacterial breakdown of the cell walls of the epidermis of the onion was found to be slow in the caecum of the goat; in addition, pieces of onion placed in the caecum through a fistula and recovered in 6–8 hours from the faeces showed little structural change. Various methods of pre-treating the epidermis were tried; boiling or soaking in warm water had little effect upon subsequent digestion in the caecum; soaking in dilute acid or alkali loosened the attachments of the cells while pro-

longed soaking in 0·2% carbonate exerted a distinctly beneficial effect upon subsequent caecal digestion. On the strength of this observation the authors state that it is possible that the sojourn of the ingesta in the rumen may result in some of the cellulose that escapes fermentation there undergoing slight fermentation in the caecum.

The cellulose forming the walls of the cycad *Dioon edule* was also resistant to the bacteria of the caecum and the general conclusion is that caecal digestion of cellulose in the ruminant is negligible.—A. T. P.

KHRUTSKII, E. T. (1938). Vliyanie nekotorykh vagotropnykh i simpatikotropnykh veshchestv na motornuyu deyatel'nost' rubtsa, setki i sychuga u telyat. **[Effect of Certain Sympatheticotropic and Vagotropic Substances on the Motor Function of the Rumen, Reticulum, and Abomasum in Calves].**—*Trud. Omsk. vet. Inst.* **11.** 55–72.

The effect of injections of atropine, pilocarpine, eserine, choline, and adrenalin was observed on the different compartments of the stomachs of six calves 1–6 months old, in which artificial fistulae had been produced in rumen, reticulum, and abomasum. The effects were observed simultaneously on all three compartments by means of a kymograph. The response to the different drugs of the motor function of each compartment differed; this was probably due to unequal innervation by the vagus and sympathetic and to the presence of autonomous nerve ganglia. The earliest response and return to normal was observed in the abomasum; the reticulum and the rumen were less receptive.—A. M.

PELLEGRINO, A. (1939). Modificazioni strutturali della cistifellea dei bovini in rapporto all'età ed alla castrazione. **[Structural Modifications of the Bovine Gall Bladder due to Age and Castration].**—*Nuovo Ercol.* **44.** 57–72.

P. examined the gall bladders of bovines of different ages, including castrated animals. He found that the mucous membrane became increasingly ridged with age and that the number of tubular glands also increased with age. Elastic fibres are absent from the mucous coat at birth and develop from the muscular layer later. Lymphocytes are also absent at birth and appear later. The circular muscular coat becomes more and more developed with age and the longitudinal ridges increase in prominence correspondingly.

Although the increase in tubular glands has been ascribed by some workers to pathological changes of an inflammatory type, P. could find no evidence of inflammatory changes or lesions and the increase in tubular structures was a regular feature of increased age.

He found no evidence of increase in lipoid material, thickening of the mucosa, or increased size of rugae in castrated animals, and concludes that this is not a feature in the bovine species.—MILLER WATSON.

HATCH, R. D. (1941). **Anatomic Changes in the Bovine Uterus During Pregnancy.**—*Amer. J. vet. Res.* **2.** 411–416.

Forty specimens of bovine uteri at various stages of gestation were studied histologically. There was considerable erosion of the epithelium in the intercaruncular region during pregnancy; in no specimen was all the intercaruncular epithelium destroyed, there being always some normal epithelial cells at the mouths of the gland ducts. Erosion seems to be a continuous process, beginning early in pregnancy and continuing until late in gestation. The maternal epithelium of the caruncle, on the other hand, is complete at all times during gestation. The placento-maternal relationship in the caruncular areas is shown to be epitheliochorial. Observations on the growth of the caruncle shows that this develops by an overgrowth of the lamina propria which pushes the epithelium towards the uterine lumen. The connective tissue is invaded by cords of epithelial cells from the surface which form pockets in the caruncle. These pockets are invaded by, and filled with, tissues of the chorionic epithelium.—N. J. SCORGIE.

HULL, F. E., DIMOCK, W. W., ELY, F., & MORRISON, H. B. (1940). **Reproductive Efficiency in Dairy Cattle.**—*Bull. Ky agric. Exp. Sta.* No. 402. pp. 161–188.

A summary of the breeding history of a large dairy herd over a period of 39 years during which accurate records were kept. The data are analysed under six headings, *viz*, (1) the entire period, 1900–39, (2) 1900–27 when there was no organized control of disease in the herd, except for TB., (3) 1928–32, during which intensive health supervision was instituted and in which contagious abortion was eradicated, (4) 1933–36, when the herd was free from contagious abortion and trichomoniasis, (5) 1937–38, when trichomoniasis infection occurred in the herd, and (6) 1939.

The calculated reproductive efficiency of the herd for each period was 71·8, 69·8, 66·7, 84·5, 76·4, and 94·5% respectively, and the percentage of known pregnancies that resulted in observed abortions was 13·6, 15·6, 12·4, 9·3, 7·3 and 2·6. The percentage of pregnancies that resulted in stillborn calves, for each period was 5·1, 3·1, 10·5, 8·0, 7·3, and 10·3, while the percentage of calves born alive that lived less than six months was 9·3, 12·1, 3·7, 0·7, 5·7, and 11·8.

On the basis of these data it is concluded that the control of disease in general and the eradication of contagious abortion aided materially in raising the reproductive efficiency of this herd.—N. J. SCORGIE.

TRIMBERGER, G. W. (1941). **Menstruation Frequency and its Relation to Conception in Dairy Cattle.**—*J. Dairy Sci.* **24.** 819–823.

By menstruation is meant the blood-tinted mucous discharge from the vagina which is sometimes observed in cattle about 48 hours after the cessation of oestrus. T. made frequent observations on 100 heifers and 100 cows which had not been mated at the previous oestrus; 100 heifers and 61 cows showed external evidence of menstruation. Two similar groups of 100 heifers and 100 cows were bred during oestrus. Of the 100 heifers bred, 81 menstruated; 61 heifers conceived and 52 or 85% of those conceiving menstruated while of the 39 that did not conceive, 29 or 74% menstruated. Of the 100 cows bred at oestrus, 61 menstruated; 72 of these cows conceived, and 50 or 69% of those conceiving menstruated, while of the 28 that did not conceive, 11 or 39% menstruated. These data do not indicate any definite relationship between menstruation and breeding and conception, but they provide evidence that the common belief that a heifer or cow which menstruates a few days after service is not pregnant is erroneous.—N. J. SCORGIE.

ANDREWS, F. N., & MCKENZIE, F. F. (1941). **Estrus, Ovulation and Related Phenomena in the Mare.**—*Res. Bull. Mo. agric. Exp. Sta.* No. 329. pp. 117.

This bulletin records a comprehensive study of the psychological and physiological events of the oestral cycle in the mare and their relationship to ovarian, uterine, and vaginal changes. Observations were made on 45 draft and 35 light mares during the breeding seasons in two successive years.

The average length of the complete oestral cycle and the average duration of oestrus agreed with the reports of other workers. Twenty-eight cases of "split" oestrus were observed; this was characterized by an initial heat period of one or more days, followed by a non-receptive period of 1–2 days duration, and a sub-

sequent return of oestrus for one or more days. Seven of nine mares bred when exhibiting "split" oestrus conceived. Eleven cases of "physiological" or "silent" heat were observed; of eight mares artificially bred during this time five conceived. The authors record that ovulation usually occurred 24–48 hours before the end of heat and most mares exhibited their maximum sex desire within two days of ovulation. Nine cases of post-oestral ovulation were observed; of four such mares artificially inseminated, three became pregnant. The size of ovarian follicles was determined by rectal palpation. Follicular fluid recovered from ten follicles ranged between 6–112 c.c. and yielded 20–75 μg. of oestrone per ml.

The physiological and histological changes in the genital tract during the oestral cycle and early and late pregnancy are described in detail. The physiological changes studied included colour changes of the vaginal mucosa, vascularity of vaginal and cervical mucosae, state of the vaginal and cervical secretions and their pH. Histological examination showed that the involution of the uterine epithelium was seldom complete by the onset of foal heat, but was usually similar to that of the sterile mare by the end of this heat. The vaginal smear was of little value in the diagnosis of oestrus.

Of 110 mares bred, 76 (69%) conceived. The average number of all services, natural and artificial, per pregnancy was 7·6. Of the lactating mares 71% became pregnant whereas 68·9% of the dry females conceived. Of 26 mares bred during foal heat 13 (50%) became pregnant. The least satisfactory breeding results were obtained with maiden mares; of 19 bred, 8 (42%) conceived. The artificial rupture of follicles did not prevent subsequent ovulation and fertilization. Only two of six mares bred following artificial rupture of a follicle became pregnant; in the remaining four there were evidences of physiological disturbances which could have been of sufficient influence to prevent pregnancy.—N. J. Scorgie.

Ryazantseva, N. (1938). Stimulirovanie i regulirovanie polovoĭ deyatel'nosti u kobyl perelivaniem krovi. **[Stimulation and Regulation of Sexual Activity in Mares by Blood Transfusion].**—*Konevodstvo.* No. 8/9. pp. 37–44. [Abst. in *Anim. Breed. Abstrs.* **9.** 206, copied *verbatim*].

Transfusion of blood from pregnant mares (400–800 cm.³) to nymphomaniac mares caused cessation of abnormal heat after 10–20 days and the onset of normal sexual periodicity. Similar treatment (700–800 cm.³) of mares with depressed sexual activity induced normal heat after 7–21 days. The method is recommended for wide practical application.

*Denzler, O. (1939). Untersuchungen über die Wirkung von Prolan auf den Eierstock von Schafen. **[The Action of Prolan on the Ovaries of Sheep].**—*Inaug. Diss., Munich.* [Abst. from abst. in *Berl. Münch. tierärztl. Wschr.* Aug. 22nd. 412. (1941)].

Forty-two sheep aged 15 months received injections of prolan (gonadotropin from the urine of pregnant women) in aqueous or oily solution and in doses of 20–100 rat units. Effects were observed in the ovaries of ten animals: in four of them corpora lutea were formed and in six mature Graafian follicles were present after the hormone administration.—J. M. Robson.

*August, H. M. (1941). Brunsterzeugung bei Schafen mit Geschlechtshormonen. **[Oestrus Production in Sheep by Sex Hormones].**—*Züchtungskunde.* **16.** 41–60. [Abst. from abst. in *Berl. Münch. tierärztl. Wschr.* Aug. 22nd. 412. (1941)].

A. suggests that lambing in the spring may have certain disadvantages and that it may be of value to produce lambing in the autumn. Since oestrus often does not occur in the spring he has suggested the possibility of inducing it by the administration of oestrogen. The injection of 10,000–15,000 I.U. of oestradiol benzoate induced oestrus; out of over 4,000 animals treated, 72·5% mated and 43·1% lambed. Hence 59·5 % of the animals which mated became pregnant. Oestrus appeared 3–7 days after the hormone injection.

—J. M. Robson.

Birkhäuser, H., & Zeller, E. A. (1940). Cholin-Esterase und Sexualhormone. I. Mitteilung über Beziehungen zwischen Sexualhormonen und Fermenten. **[Choline Esterase and Sex Hormones. I. On the Relationship Between Sex Hormones and Enzymes].**—*Helv. chim. Acta.* **23.** 1460–1464. [Abst. in *Anim. Breed. Abstrs.* **9.** 165, copied *verbatim.* Signed: J. G. Carr].

The choline esterase content is much higher in mature female rats than in young females or in males. It falls after ovariectomy, and is not restored after oestrogen administration. Administration of oestrogen and progesterone causes a rise to normal or even higher values.

*Zeller, E. A., & Birkhäuser, H. (1940). Ueber eine in vitro-Schwangerschaftsreaktion. **[An *in vitro* Pregnancy Test].**—*Schweiz. med. Wschr.* 975–976. [Abst. from abst. in *Zbl. Bakt. I.* (*Ref.*). **139.** 469].

A simple manometric method is described by which the diaminoxydase activity of serum can easily be determined. The authors state that in non-pregnant women the diaminoxydase content of the serum is at most 0·01 units, while in pregnant women the serum content is 0·05–0·19 units. It is suggested that this may be used as a purely physico-chemical method for the diagnosis of pregnancy.—J. M. Robson.

Khrustalev, S. A. (1939). K voprosu o krovyanykh plastinkach zdorovych koz. **[The Problem of Blood Platelets in Healthy Goats].**—*Trud. Kirov. zootech.-vet. Inst.* **3.** No. 12. 3–18.

The number of blood platelets in healthy goats (young and old) is not constant. When the count method of Fonio was used, an average of 396,490 was found and by Godry's method (which in K.'s opinion is more precise but less suitable for practical purposes) a value of 668,936 per cu. mm. was observed. In male goats and kids the number of platelets was a little higher. The shape and size varied considerably, the most common forms being oval and circular discs from 1·2–4·7 μ in diameter; occasionally in kids gigantic forms of 7·4 μ were found. With Pappenheim's stain a homogenous basal substance and central granular portion were distinguishable. The granules might be dispersed throughout the basal substance or arranged closely together, simulating a nucleus.

A detailed review is given of the morphology, role and diagnostic significance of platelet counts.—A. M.

Lamoreux, W. F. (1940). **Spermatozoal Antibodies and Infertility in the Fowl.**—*J. exp. Zool.* **85.** 419–430.

The report that subcutaneous injection of testicular material into laying fowls results in infertility could not be confirmed. Spermatozoal agglutinating antibodies to a titre of 1 : 2000 were produced by intravenous injection of semen into hens. Hens with spermatozoal antibodies remained fertile. No antibodies could be produced by subcutaneous injection of semen. Neither intramuscular injection nor percutaneous application of testosterone propionate caused infertility.—F. D. A.

HAMMOND, J. C., & TITUS, H. W. (1941). **Effect of Colored Light and Colored Walls on the Growth and Mortality of Chickens.**—*Poult. Sci.* **20.** 507–513.

The effect of eight different coloured lights and coloured walls upon growing chicks was observed. Six trials in duplicate were carried out with each colour system. Each group contained approximately 40 chicks, a total of 3,760 being used.

The results indicate that the growth and mortality of the chicks was affected by light intensity rather than by difference in colour of light. Difficulty was experienced in getting chicks in an environment of low light intensity to eat and drink. If taught to eat, chicks in low light intensity grew as fast and used their food as efficiently as those raised in an environment of higher light intensity. Neither colour nor intensity of light, to which pullets were subjected during the first 16 weeks of life, subsequently affected their adult body weight, egg production, fertility, or egg hatchability.

—F. D. ASPLIN.

BRODY, S. (1940). **Reactions of Animals to Environmental Temperature, Humidity, and Air Movement.**—*Agric. Engng, St. Joseph, Mich.* **21.** 265–268.

B. gives a summary of the basic physiological factors relating to the reactions of animals to their environment, and emphasizes the fact that the maintenance of air currents by means of fans is of no value in the protection of non-sweating animals from heat as it only brings the hot air in contact with the skin, thus increasing the animal's discomfort. The best method is to avoid feeding and exercise at the hottest times of the day, and to avoid giving unbalanced rations such as straw or poor hay which produce particularly high heat increments.

The resistance of animals to cold is much greater than that to heat, and is increased by the natural adaptation of the body coverings which takes place as the seasons change. The thermoneutrality zone varies with the season, and the temperature to which the animal is acclimatized, but the maximum temperature is about 85°F. The resistance to cold is greater in large animals than in small ones.

POISONS AND POISONING

TROLL, P. (1941). Ein Fall von Taumellolchvergiftung beim Pferd. (Kasuistische Mitteilung). **[Darnel Poisoning in a Horse].**—*Tierärztl. Rdsch.* **47.** 555–556.

A horse with severe diarrhoea and a marked derangement of the sensorium was found to be consuming oats containing a quantity of darnel seeds. Treatment with coramine, lentin, and heliotropin, and complete rest, resulted in complete recovery in 16 days.—J. G. CARR.

ROBERTS, G. A. (1941). **Paraplegia (Wobbles) in Cattle.**—*Vet. Med.* **36.** 507–509.

This disease, known locally as " derriengue ", occurs only in areas of the Dominican Republic in which two species of cycad, *Zamia integrifolia* (syn. *latifolia*) and *Z. media*, exist. The plants are described and illustrated. They are not readily eaten and their effects, as shown by feeding experiments, appear to be cumulative. The symptoms are described and appear to be relative to a chronic disease in which the only characteristic lesion is paleness and softening of the spinal cord in the lumbar and sacral regions. A similar plant, *Macrozamia fraseri*, was recorded as poisonous in New South Wales, and acid potassium oxalate was considered to be the toxic agent. R. considers that a salt of oxalic acid may be the cause of the Dominican losses, especially as haematuria is a frequent symptom.—C. V. WATKINS.

COHRS, P. (1941). Die chronische Fluorvergiftung der Haustiere vom Standpunkt der Fleischhygiene. **[Chronic Fluorosis of Domestic Animals from the Meat Hygiene Aspect].**—*Z. Fleisch- u. Milchhyg.* **52.** 1–4.

Chronic F poisoning, especially of cattle and sheep, has recently become more frequent in Germany. Cases usually occur within a distance of 5 km. from chemical factories where F-containing material is used. The pathology is described and illustrated by photographs. Since F is not deposited in the muscles or organs to any great extent, and that of the bones is largely removed by cooking, the meat is regarded as fit for food unless extreme emaciation or cachexia is present.

—J. G. CARR.

OPPERMANN, T. (1942). Zinkvergiftungen bei Schweinen. **[Zinc Poisoning in Pigs].**—*Dtsch. tierärztl. Wschr.* **50.** 25–26.

A fatal illness in young pigs which could not be diagnosed at the time was later traced to the use of a zinc-plated funnel in a potato mashing machine in which the food for the pigs was prepared. Descriptions of zinc poisoning in the literature suggested that the symptoms might be due to this cause, although no chemical investigations of the organs could be made. Signs of intoxication were also observed in hens which picked up the bits of potato lying about the mashing machine. When the zinc-lined funnel was replaced by a different type, no further cases of poisoning occurred.—A. M. COPPING.

STILES, B. F. (1940). **Lead Poisoning in Ducks of Southwestern Iowa during the Winter of 1938-39.**—*Proc. Iowa Acad. Sci.* **47.** 397–399.

An account is given of lead poisoning in wild ducks which had concentrated at a refuge on which no shooting had been permitted for seven years. It appears that the ducks picked up the shot before they came to the refuge. Lead poisoning was reported in all cases submitted for laboratory examination. An unsuccessful attempt was made to treat 107 sick mallards by maintaining them in warm quarters and feeding various diets; all but 12 died, and the gizzards of all but a few were found to contain lead shot.—ALASTAIR N. WORDEN.

I. SLAVIN, G., & WORDEN, A. N. (1941). **Salt Poisoning in Pigs.**—*Vet. Rec.* **53.** 694–695.

II. WORDEN, A. N. (1941). **Salt Poisoning in Pigs.**—*Ibid.* 695–699.

I. Experimental attempts to induce NaCl poisoning in pigs were unsuccessful. Increasing concentrations of NaCl were added to a normal diet of four pigs; concentrations up to 5% of the ration failed to produce any disturbance other than slight diarrhoea in one animal; at concentrations of 10 and 20% the pigs refused the food. Oral administration of up to 8 oz. NaCl in solution to four pigs of about 160 lb. live weight (access to water being denied until some hours afterwards) produced no clinical symptoms other than vomiting in one animal. Some elevation of blood chloride (as much as 20%) was found, persisting even 24 hours after dosing.

II. A semi-popular review of the literature on NaCl poisoning in pigs. The available evidence suggests that it is very doubtful whether in normal circumstances pigs will consume voluntarily toxic doses of NaCl, and that many of the recorded cases of " salt poisoning " may be due to factors other than NaCl. Emphasis is laid on the need for accurate recording by veterinary practitioners of the full circumstances of reputed cases of NaCl intoxication.—ALFRED EDEN.

FRISCHBIER, & RICHTSTEIGER. (1941). Bildung von

Oxalsäure durch Aspergillus niger in Brot und in der Streu. **[Production of Oxalic Acid by *A. niger* in Bread and Straw].**—*Z. Veterinärk.* **53.** 391.

A. niger growing on bread or on moist straw formed considerable quantities of oxalic acid, even as much as 3·38% on the dry weight of bread with a heavy growth of mould. Large amounts of oxalic acid were produced by cultures of *A. niger* on amide, amino acid and protein media. The lethal dose of oxalic acid for man is about 4 g. and 0·6 g. has a severely toxic effect. Tests on g. pigs showed that bread infected with *A. niger* was toxic. Straw infected with *A. niger* is often indistinguishable from unspoiled straw and may be a source of serious illness in horses or other stock.

—A. M. Copping.

French, A. J. (1941). **Interstitial Myocarditis in Mice and Rats Produced by Neoprontosil, Sulfanilamide, Sodium Sulfapyridine and Sodium Sulfathiazole.**—*Proc. Soc. exp. Biol., N.Y.* **48.** 1–3.

An interstitial myocarditis in which the cellular infiltrations included eosinophile cells in varying numbers was observed P.M. in mice, rats, and rabbits which were given intraperitoneal injections of neoprontosil, sulphanilamide, sodium sulphapyridine, and sodium sulphathiazole 10, 20, and 30 days before being killed. The amount of the drug injected was comparable to the usual clinical dosage for man. A "spontaneous" myocarditis was observed in several of the control rabbits, but no cellular infiltrations were found in the hearts of either the control rats or mice. The myocarditis was histologically similar to that observed in the hearts of human beings dying after the administration of these drugs.

—R. Allcroft.

I. Taylor, E. L. (1942). **A Note on Phenothiazine Poisoning with Special Reference to Reports of its Occurrence in Horses.**—*Vet. Rec.* **54.** 95–97.

II. Boley, L. E., Morrill, C. C., & Levine, N. D. (1942). **A Note on the Effect of Large Doses of Phenothiazine on Draft Horses.**—*Vet. Med.* **37.** 26–29.

I. T. reviews in detail the cases of phenothiazine poisoning in horses, listing the symptoms and pathological effects as far as they are known. Sometimes the intoxication appears to be the result of overdosing, but sometimes it is due to what can only be described as a susceptibility to phenothiazine exhibited by individual animals or small groups of animals. T. suggests that dietary factors may have some bearing on the subject. His general conclusions are important :–

"The actual incidence of phenothiazine sensitivity must be very low, and there can be no reason for any drastic curtailment in the use of this drug for the treatment of existing cases of strongylosis ; nor is there any reason to discontinue its use as a preventive measure among horses that are known to be safe subjects. . . . However, caution must be exercised in treating anaemic animals, and wherever preventive treatment is contemplated among a number of horses a small representative proportion should receive a trial dose first."

II. One horse, given 324 g. phenothiazine by stomach tube, died three days after treatment. This horse had been fasted for five days before treatment and was also suffering from carcinoma of the penis. The most interesting P.M. findings, from the viewpoint of phenothiazine toxicity, were the general icterus of the tissues and the greatly enlarged kidneys. A second horse, given 80 g. phenothiazine in its food, showed no significant changes in the blood or urine, while two others, given 160 g. and 400 g. respectively, exhibited a fall in the haemoglobin level, but no significant change in the constituents of the urine.—D. G. Davey.

I. Toynton, C. (1941). **Effects of Phenothiazine on the Equine Blood Picture.**—*Vet. Med.* **36.** 481.

II. McCulloch, E. C., & Seghetti, L. (1942). **The Effect of Phenothiazine on the Haemoglobin Concentration, Erythrocyte Count and Leucocyte Count of Swine.**—*Ibid.* **37.** 80–84.

I. Two three-year-old Percheron horses were each given 72 g. of phenothiazine. About three days later, a slight decrease occurred in the number of erythrocytes and leucocytes, but there was a quick return to normal. Egg counts in each animal were reduced to zero.

II. A pig weighing 62 lb. was given 12 g. phenothiazine daily for 74 consecutive days, a total of 888 g. A severe posterior paralysis developed 19 days after the start of the experiment, but the blood picture never differed significantly from that of a control. At necropsy no gross changes were observed ; four ascarids were found. A second pig, given 30 g. at 15-day intervals to a total of 150 g. increased in weight from 64 to 109 lb. and showed no significant change in the blood picture. The same pig was later given 30 g. daily for 42 consecutive days, a total of 1,260 g. The haemoglobin level and erythrocyte count were reduced, but the weight increased from 110 to 150 lb. A third pig received 15 g. daily for the same period, and also showed a fall in haemoglobin concentration although its weight increased from 123 to 145 lb. In no instance did the phenothiazine have any noticeable effect on the leucocytes. No gross pathological changes were observed at necropsy. [The authors doubt whether significance should be attached to the paralysis observed in one of the pigs, but it should be noted that Lapage (1940. *Vet. Rec.* **52.** 648–657.) and Roberts (*V. B.* **12.** 245.) report incoordination of the hindquarters as one of the toxic effects of phenothiazine in these animals.]—D. G. Davey.

Wright, W. L. (1942). **A Note on the Effect of Repeated Doses of Phenothiazine on Sheep.**—*Vet. Med.* **37.** 33.

Three yearling lambs were each given a single dose of 25 g. phenothiazine, while three others were each given 25 g. weekly for six weeks. None of the animals showed changes in weight, in haemoglobin, or in urinary constituents which were significantly different from those observed in three untreated controls.—D. G. Davey.

THERAPEUTICS

I. Herrell, W. E., & Heilman, D. (1941). **Experimental and Clinical Studies on Gramicidin.**—*J. clin. Invest.* **20.** 583–591.

II. Weinstein, L., & Rammelkamp, C. H. (1941). **A Study of the Effect of Gramicidin Administered by the Oral Route.**—*Proc. Soc. exp. Biol., N.Y.* **48.** 147–149.

III. Rammelkamp, C. H., & Weinstein, L. (1941). **Hemolytic Effect of Tyrothricin.**—*Ibid.* 211–214.

I. Studies were made of the inhibitory effect of tyrothricin, gramicidin, and tyrocidine on several strains of *Diplococcus pneumoniae*, group A Lancefield haemolytic streptococci, *Streptococcus viridans*, *Str. faecalis*, and *Staphylococcus aureus* in tissue-culture media. The chief advantages of the tissue-culture method are that the effect can be observed (1) of the antibacterial substance on pathogenic bacteria growing in the presence of tissue fragment, serum, and tissue extract, and (2) of the substance on the growth or maintenance of various types of cells and on erythrocytes suspended in the tissue culture clot. These conditions approach those obtained *in vivo*. The amount of gramicidin required to inhibit the growth of *D. pneumoniae* was 0·5–2·5 μg. per ml., for haemolytic streptococci 5–20 μg. per ml.,

for *Str. salivarius* 10–60 μg. per ml., for *Str. faecalis* 20–60 μg., and for *Staph. aureus* 100–300 μg. per ml., although three strains of the last organism were not inhibited by 300 μg. per ml. A slightly greater amount of tyrothricin than of gramicidin had to be used to inhibit growth, but much greater concentrations of tyrocidine were necessary to obtain the same degree of inhibition.

The haemolytic effect of the three substances was investigated. It has already been shown that gramicidin has a marked haemolytic action [*V. B.* **12.** R1–R6.] and the present observations indicate that the powerful haemolytic action of tyrothricin on erythrocytes is due to the presence of gramicidin. Tyrocidine did not appear to be very haemolytic. When tyrothricin or gramicidin was heated in an aqueous suspension, loss of haemolytic and bactericidal activity occurred. Addition of 50 and 100 μg. of gramicidin and tyrocidine to 1 ml. of whole human blood caused no toxic effect or damage to the leucocytes over a period of eight hours.

In clinical studies on the use of gramicidin, an isotonic solution of tyrothricin containing 200 μg. per ml. was used locally in 12 cases of various types of infections in which Gram-positive organisms were present. A marked beneficial effect was noted in most cases and no evidence of toxicity or damage to the tissues was observed; the healing of wounds appeared to be considerably benefited in some cases. It is pointed out that because of the marked haemolytic effect of gramicidin it is inadvisable to use this substance clinically in any way except locally or perhaps to irrigate infected cavities which do not communicate with the bloodstream.

II. Because gramicidin has been found to be bactericidal for Gram-positive organisms *in vitro* and *in vivo*, an investigation was made on the effect of gramicidin on the intestinal flora. Mice were fed a diet which produced an intestinal flora rich in *Lactobacillus acidophilus* and 0·1–1 mg. of tyrothricin was given by mouth once or twice daily for 21 days. No reduction in the number of *L. acidophilus* was observed in the faeces compared with control animals, although the dose of tyrothricin was in some cases 160 times the amount found effective against this organism *in vitro*. No lesions in the gastro-intestinal tract due to administration of tyrothricin were observed P.M.

III. The haemolytic action of tyrothricin, gramicidin, and tyrocidine was studied on rabbit and human erythrocytes in isotonic saline, in 5 and 10% glucose in saline, and in distilled water. All three substances exhibited a definite haemolytic action, although the results indicate that the haemolytic activity resides primarily in the tyrocidine fraction. This does not agree with the observations on haemolysis made in I. The haemolytic action was not inhibited in 5 or 10% glucose in distilled water and only very slightly in 5 or 10% glucose in saline.—R. Allcroft.

Welsch, M. (1941). **Bactericidal Substances from Sterile Culture-Media and Bacterial Cultures.**—*J. Bact.* **42.** 801–814.

From several ordinary sterile culture media, *e.g.* broth and peptone, an ether-soluble bactericidal substance has been extracted which, when suspended in buffer at a dilution corresponding to its actual concentration in the parent medium, will readily kill certain susceptible bacteria. Since these bacteria are able to grow well in the original medium, the bactericidal substance, before extraction, must be present in a harmless state, possibly due to its association with some protein molecule. It is therefore suggested that at least part of the toxic agents isolated by various investigators from bacterial cultures in complex media need not necessarily be of bacterial origin.—E. Cotchin.

*Domagk, G., & Hegler, C. (1940). Chemotherapie bakterieller Infektionen. **[Chemotherapy of Bacterial Infections].** pp. 185. Leipzig: S. Hirzel. [R.M. 9·50]. [Abst. from review in *Zbl. Bakt. I.* (*Ref.*). **139.** 32].

According to the reviewer this book gives a good survey of the development and scope of the new chemotherapy. The actions of sulphanilamides and their many derivatives are described and their effects on various organisms discussed. The estimation of sulphonamides in urine, blood, etc. and their excretion and toxicology are described. The clinical applications of these drugs in the many conditions in which they have proved of value are thoroughly discussed.—J. M. Robson.

Ardley, D. G. (1941). **The Common Sulphonamides: Nomenclature, Structure and Uses.**—*Lancet.* **241.** 625–628.

The article gives a clear and convenient description of the sulphonamides in common use and of their chemical composition and main properties. Proprietary names for the various substances are also given. Special attention is drawn to the advantage possessed by certain of the newer compounds like sulphathiazole, sulphadiazine, and sulphacetamide. The value is discussed of substances slowly absorbed from the intestine, *e.g.* sulphaguanidine in the treatment of bowel infections. Brief reference is also made to a number of related compounds, *viz*, sulphones, sulphoxides, and sulphides.—J. M. Robson.

Walker, H. A., & van Dyke, H. B. (1941). **Control of Malaria Infection (*P. lophurae*) in Ducks by Sulfonamides.**—*Proc. Soc. exp. Biol., N.Y.* **48.** 368–372.

Oral administration of sulphonamides (sulphanilamide, sulphathiazole, and sulphadiazine) for six days to young Peking ducks infected with *Plasmodium lophurae* reduced the number of parasites in the blood after a few days and the birds survived for several weeks with relatively few, or occasionally no, parasites in the blood. Sulphathiazole and sulphadiazine were much more effective than sulphanilamide, but none of these drugs was as effective as the hydrochlorides of quinine or atebrine. It was previously reported by Manwell *et al.* [*V. B.* **12.** 244.] that sulphapyridine could prevent patent infection by *P. circumflexum* in canaries.—R. A.

*Demuth, F. (1940). Ueber knotenförmige Cow-pox beim Menschen und ihre Behandlung mit Sulfonamidpräparaten. **[Nodular Cow Pox in Man and its Treatment with Sulphonamides].**—*Derm. Wschr.* **111.** 1058–1060. [Abst. from abst. in *Zbl. Bakt. I.* (*Ref.*). **139.** 281].

The patient became infected by milking a cow with cow pox and developed a typical nodular cow pox. The administration of a sulphonamide produced satisfactory effects. [No further details are given in the abstract.]—J. M. Robson.

Leach, B. E., & Forbes, J. C. (1941). **Sulfonamide Drugs as Protective Agents against Carbon Tetrachloride Poisoning.**—*Proc. Soc. exp. Biol., N.Y.* **48.** 361–363.

Preliminary experiments on rats indicated that oral administration of sulphonamides, especially sulphanilamide, exerted a definite protective action against liver necrosis from acute carbon tetrachloride poisoning, although the degree of protection was less than that obtained by subcutaneous administration of xanthine or India ink. The mechanism of the action is not known, but it appears to be related to the sulphonamide group,

as sulphanilic acid exerted little if any protective action. —R. ALLCROFT.

KLEIN, L. A., KLECKNER, A. L., & BILTZ, R. O. (1941). **Sulfapyridine in Cattle : A Contribution to Its Pharmacology.**—*Amer. J. vet. Res.* **2.** 333–340.

The experiments were designed to indicate the time relationships between the concentration of sulphapyridine in the blood and the amount and frequency of its administration as a drench. When it was administered in a daily dose of 4 g. per 100 lb. body weight for two days to five cows, each dose being divided into four or five fractions given at intervals of 4–6 hours, a blood concentration within the usually accepted therapeutic level (in man) of 3–6 mg. per 100 ml. of blood was attained in 12–34 hours. The level began to fall 2–4 hours after the last fractional dose was given. When the drug was administered to four cows in daily doses of 5 and 6 g. per 100 lb. body weight for six days (each dose fractionated for four- or eight-hour intervals), the therapeutic concentration was attained in 12–36 hours. The concentration progressively increased to the sixth day and attained 11·6–13 mg. per 100 ml. of blood. When daily doses of 7, 8, and 9 g. per 100 lb. body weight (each dose fractionated for eight hour intervals) were given to three cows, the therapeutic concentration was attained in 9–38 hours. For maintaining the therapeutic concentration in the blood there was little to choose between the various periods to which the doses were fractionated. In all the cows some degree of inappetence, constipation, and fall in milk production was caused by the drug, but a return to normality immediately followed the cessation of treatment. In one cow, given 8 g. per 100 lb. body weight, urticaria-like swellings developed in the skin These, too, were transient. No effect was noted on the red cells, but the lymphocytes decreased and the neutrophiles increased in number.—D. G. DAVEY.

BRYAN, A. H. (1941). **Sulfapyridine in the Treatment of Feline Distemper.**—*Vet. Med.* **36.** 434.

Sulphapyridine is stated to have been employed with success in the treatment of nine cases of "feline distemper"; in one there was a violent reaction to the drug, but in the others recovery was uneventful. [The cases described by B. appeared to resemble the feline febrile catarrh which in the abstractor's opinion is distinct from the feline distemper studied by HINDLE & FINDLAY—*V. B.* **5.** 495.]—ALASTAIR N. WORDEN.

MASON, M. M. (1942). **Effect of Sulfanilamide and Sulfapyridine on Antibody Formation.**—*Vet. Med.* **37.** 30–32.

Twenty-seven rabbits were immunized with pneumococcus type I vaccine. Nine were also given daily doses of sulphanilamide; another nine were given similar doses of sulphapyridine (the dosage in both groups being determined by the rate recommended for man), while the remaining nine were kept as controls. The antibody contents of the blood in the three groups were compared over a period of ten weeks, and it was concluded that full therapeutic doses of the two drugs do not interfere with antibody production.—D. G. DAVEY.

WEIL, A. J., & GALL, L. S. (1941). **Chemotherapeutic Testing with Sodium Sulfathiazole in the Developing Chick Embryo.**—*J. infect. Dis.* **69.** 97–101.

Experimental infection of the developing chick embryo by infection of the chorio-allantoic membrane, the yolk sac, and the amnion offers a convenient method for chemotherapeutic investigation, which is especially of value in the case of the genus *Shigella* where no other convenient laboratory animal is available. Administration of sodium sulphathiazole produces a therapeutic effect in infection of the developing chick embryo with *Salmonella pullorum* and *Sh. flexneri*.—J. M. ROBSON.

FARR, M. M., & ALLEN, R. W. (1942). **Sulfaguanidine Feeding as a Control Measure for Cecal Coccidiosis of Chickens.**—*J. Amer. vet. med. Ass.* **100.** 47–51.

These experiments were designed to show the effect of sulphaguanidine treatment on two-week-old chicks infected with *Eimeria tenella*. The effect was measured by oocyst production, clinical evidence, weight changes, mortality, and pathological changes. Chickens receiving a 1% sulphaguanidine mash before and after inoculation with oocysts were all found to be lightly infected with caecal coccidiosis; those receiving a 2% sulphaguanidine mash during the three days before inoculation and for nine days afterwards exhibited no symptoms, lesions, or coccidial stages. Oocyst production was reduced in existing infections when 3–5% sulphaguanidine mash was fed daily as soon as blood appeared in the faeces, but the birds showed no marked improvement. Surviving birds from all these groups proved strongly susceptible to reinoculation 29 days later. The birds receiving prophylactic doses of sulphaguanidine mash showed an increased average weight gain over the inoculated controls and they in turn showed a higher average weight gain than those receiving medicated mash as a curative agent.—C. HORTON SMITH.

BLOOMFIELD, A. L., & LEW, W. (1941). **Prophylactic Effect of Sulfaguanidine against Ulcerative Cecitis in Rats.**—*Proc. Soc. exp. Biol., N.Y.* **48.** 363–368.

0·5% sulphaguanidine was added to the diet of a group of 21 rats from a colony which had developed ulcerative caecitis [see JONES & STEWART—*V. B.* **11.** 307]. Judging from the amount of food eaten, each animal ingested about 50–75 mg. of the drug daily. A group of 21 control animals (litter mates of the experimental rats) received the same diet without sulphaguanidine. The rats receiving the drug gained weight rapidly and the incidence of the disease was much lower in this group than in the control group, lesions which did occur being minimal compared with the advanced lesions found in most of the untreated animals. The relatively low level of sulphaguanidine found in the blood suggested that this drug is less readily absorbed than some of the other sulphonamides. The cause of caecitis is not known, but *Salmonella enteritidis* was readily recovered from the stools of rats with the disease.—R. A.

POTH, E. J., & KNOTTS, F. L. (1941). **Succinyl Sulfathiazole, a New Bacteriostatic Agent Locally Active in the Gastrointestinal Tract.**—*Proc. Soc. exp. Biol., N.Y.* **48.** 129–130.

During administration of 1 g. per kg. body weight of succinyl sulphathiazole to dogs in six daily doses for five weeks, no toxic symptoms were observed and the number of *Bacterium coli* per gramme of wet stool averaged less than 100 organisms compared to an average normal flora of 10,000,000. This dosage of succinyl sulphathiazole gave a faecal drug concentration of 5–10% and about 5% was excreted in the urine without the appearance of crystals. The drug was administered to 40 human patients with various organic lesions and acute intestinal infections without any toxic reactions. It is stated that the activity of this drug is limited largely to its local effect on the contents of the gastro-intestinal tract.—R. ALLCROFT.

KERRUISH, D. W. (1941). **An Experiment with Phenothiazine.**—*Vet. Rec.* **53.** 309–310.

K. carried out an experiment to determine the value of phenothiazine when administered to fattening lambs. Out of 18 lambs, half were used as controls and received no treatment; the remaining nine animals received an

initial dose of 10 g. and a second dose of 5 g. eight weeks later. All lambs were weighed singly each week over the period of eight weeks and at the end of the 11th week. The control animals together gained 139 lb. in weight during the experiment while the experimental group gained 189 lb. K. considers the administration of phenothiazine to fattening lambs, even when the animals do not show clinical signs of worm infestation, to be of value as it enables them to be fattened more easily and more rapidly.—J. N. OLDHAM.

I. HAY, J. R. (1941). **The Treatment of Sheep Parasites with Repeated Doses of Phenothiazine.**—*J. Amer. vet. med. Ass.* **98.** 462–465.

II. SHAW, J. N. (1941). **Use of Phenothiazine in Oregon Sheep.**—*N. Amer. Vet.* **22.** 280–283.

I. Using 12 sheep, H. treated two with single doses of 25 g. phenothiazine, two with repeated 25 g. doses, two with single doses of 0·3 g. per lb. body weight and two with repeated doses at this rate; the remaining four animals were used as controls. Sheep receiving repeated doses were treated for 4½ months at 12 (*sic*) fortnightly intervals. From worm counts made at autopsy and from the weights of the animals before and after treatment, H. considers that repeated fortnightly doses of 25 g. produced the best results.

II. From experiments involving about 70 Oregon sheep, heavily infested with common trichostrongyles and treated with 22–87 g. phenothiazine, S. considers that the drug has not proved efficient for the removal of these parasites. Thus, from a yearling lamb given 30 g. and examined P.M. seven days later, about 2,127 *Ostertagia circumcincta* and 12,969 *Trichostrongylus* spp. were recovered. From another yearling, receiving in all 85 g. in three treatments, 3,925 *O. circumcincta* and 1,980 *Trichostrongylus* spp. were estimated. Approximately 9,000 *O. circumcincta* and 25,020 *Trichostrongylus* spp. were recovered at autopsy from one of 50 yearlings which had each been given 25 g., although deaths had continued after dosing was begun.—J. N. OLDHAM.

I. ROBINSON, V. B., & KAYS, J. M. (1941). **Experiments with Phenothiazine in the Treatment of Horses for Strongyles.**—*Vet. Med.* **36.** 557–559.

II. BOLEY, L. E., LEVINE, N. D., WRIGHT, W. L., & GRAHAM, R. (1941). **Treatment of Percheron Horses for Gastrointestinal Parasites with a Phenothiazine-Carbon Disulfide Mixture.**—*J. Amer. vet. med. Ass.* **99.** 408–411.

I. Evidence is presented that phenothiazine in doses as small as 25 g., given either in the food or in capsules, reduces the number of strongyle ova appearing in the faeces. Doses of 50 g., administered to five horses, produced no toxic effects.

II. With a view to the simultaneous removal of ascarids, strongyles, and bots, 44 horses were given a mixture of 40 g. phenothiazine and 24 ml. CS_2 in capsules following a 36-hour fast. Many bots were passed after treatment, and egg counts showed that the mixture was also efficient against the strongyles and ascarids. There was no significant change in the average haemoglobin level of the treated horses. Urine studies were made on 23 mares, but no evidence of kidney damage as a result of the treatment was found.
—D. G. DAVEY.

*GANSLMAYER, R., & GRMOVSEK, P. (1941). **[Treatment of Liver Rot in Sheep by Hexachlorethane].**—*Vet. Arhiv.* No. 2. pp. 100–117. [Abst. from abst. in *Tierärztl. Rdsch.* **47.** 494].

An account of Yugoslavian research on hexachlorethane, necessitated by the shortage of the capsules necessary in carbon tetrachloride therapy. Hexachlorethane tablets were found to be quickly soluble in bile. The dose range for affected sheep was 1–10 g. It was found that good results were obtainable with 6–8 g., and that 10 g. doses were not toxic. The only drawback to the wide use of hexachlorethane is its high cost.

MAYER, M. (1940). Ueber morphologische Veränderungen an Blutparasiten durch Einwirkung chemotherapeutischer Substanzen. Die Wirkung von Synthalin (Dekamethylen-Diaguanid) auf Trypanosomen und Leishmanien. **[Morphological Changes in Blood Parasites Caused by Chemotherapeutic Substances. Action of Synthalin on Trypanosomes and Leishmania].**—*Arq. Inst. biol., S. Paulo.* **11.** 229–234. [In German].

The administration of synthalin to mice infected with *T. brucei* and *T. equiperdum* caused disappearance of the blepharoplast in many parasites. A similar effect was obtained in a hamster infected with leishmania, but the animal was not cured; the treatment caused a disappearance of a natural trypanosome infection from this animal.—J. M. ROBSON.

*VÖLCKERS, H., & LÖFFLER, J. (1940). Zur Behandlung der Serumkrankheit mit Torantil. **[Treatment of Serum Sickness by Torantil].**—*Münch. med. Wschr.* 1145–1146. [Abst. from abst. in *Zbl. Bakt. I.* (*Ref.*). **139.** 468].

In an allergic organism, the interaction of foreign protein (allergen) and the antibodies produced by the organism results in the formation of toxic products, whose pharmacologic effects are, to a large extent, parallel with those of histamine. Research has shown that a substance [histaminase] capable of destroying histamine is formed in the intestinal mucous membrane. Torantil Bayer is such a substance, prepared from the intestinal mucosa, and after introduction into the body it destroys these histamine-like toxic products. Doses of 2 ml. were injected intramuscularly into 50 children, aged 1–13 years, at the first signs of serum sickness. In 40 of these cases satisfactory results were obtained, with complete disappearance of symptoms.

—. (1941). **Salt in the Treatment of Enteritis in Swine.**—*Vet. Med.* **36.** 495–499.

It is stated that sodium chloride solution, administered usually in buttermilk, has been found by many Iowa veterinarians to be the most satisfactory form of treatment yet devised for "swine enteritis". The exact nature of most of the outbreaks so treated is admittedly undetermined, although many were apparently of necrotic enteritis. There were no toxic effects when ample quantities of drinking water were provided.

A detailed description is given of the treatment as carried out for several years at two large pig farms. At the first, an approximately 2% solution of NaCl in buttermilk is fed *ad lib.* for two four-day periods, with a three-day interval between, while at the second, a lesser [unstated] concentration is fed throughout the fattening period.—ALASTAIR N. WORDEN.

*BOI, F. (1941). Sulla terapia delle bronchopolmoniti degli ovini. **(Treatment of (Verminous) Broncho-Pneumonia in Sheep].**—*Clin. vet., Milano.* **64.** 45–50. [Abst. from abst. in *Tierärztl. Rdsch.* **47.** 494].

B. claims good results from the use of iodine solution (1 part I_2, 2 parts KI, 1,500 parts distilled water). Sheep were injected intratracheally in the right dorso-ventral position one day and in the corresponding left position the next day. The dose was 15 ml. for sheep, 10 ml. for young sheep, and 5–8 ml. for lambs. Results became apparent in 12 days, and clinical and faecal examination confirmed that a great reduction in lungworm infestation had taken place.

Leusden, F. P., & Derlich, R. (1940). Bakterien- und Sporenabtötende Wirkung des Lebertrans. **[Bactericidal and Sporicidal Action of Cod Liver Oil].** —*Zbl. Bakt. I.* (*Orig.*). **146.** 284–296.

Cod liver oil is sterile and exerts a bactericidal action provided the bacteria have not been previously suspended in an aqueous medium. The resistance of different organisms varies within wide limits. The oil also kills those spores which are not much more resistant than the vegetative forms of the organisms. The bactericidal principle of cod liver oil is not water soluble.—J. M. Robson.

—. (1941). **Economy in the Use of Drugs During the War. Medical Research Council's Provisional Memorandum on Drugs for Veterinary Purposes.**—*Vet. Rec.* **53.** 106–107.

The National Veterinary Medical Association of Great Britain and Ireland has commented upon the Provisional Memorandum of the Medical Research Council on drugs for veterinary use during the war. A supplement to the Memorandum contains a list of drugs in common use by veterinary surgeons and these are grouped in three categories, *viz*, (A) drugs which are either readily available at present or regarded as essential; (B) drugs which are essential for certain purposes but the use of which should be restricted, and (C) drugs which are not essential and do not justify importation or manufacture in war-time. Only three drugs (buchu, gentian, scilla and syr. ferri phos. co.) occur in category C. The Association suggests that 16 drugs (including alcohol, amylum, and betanaphthol) might be omitted, and that six others (including acacia, ac. picric, adeps, cascara, glucose and santonin) might be included in the list. The Association believes that a considerable economy in drugs would result if veterinary practitioners were supplied with a list indicating those drugs which are freely available and the use of which would not interfere with the war effort. It is also of the opinion that linseed should be used as a foodstuff, and the oil should be substituted by liquid paraffin, and that the efficacy of substitutes for rape oil renders the reservation of that oil for external use unnecessary. Sinapis, it is said, cannot be regarded as an effective substitute for cantharides blister.—H. V. H.

PUBLIC HEALTH

Pohl, G., & Aschmoneit, E. (1940). Ueber das Vorkommen von Krankheitserregern in erhitzter Magermilch. **[Pathogenic Organisms in Heated Skim Milk].**—*Berl. Münch. tierärztl. Wschr.* March 22nd. 135–138.

The authors collected 255 samples of skim milk from 194 dairies in Eastern Prussia. All the samples were taken from milk that should legally have been heated, prior to being sold for animal consumption, so as to ensure freedom from living pathogenic organisms.

Bacteriological examination by cultural and biological means revealed the presence of viable pathogens in six of the samples. Mastitis streptococci were detected in two samples, *Brucella abortus* in three, and both *Br. abortus* and tubercle bacilli in one. In all but one of the cases the authors were able to give valid reasons for the apparent ineffectiveness of the heating. It is concluded that proper heating, together with a rigid disinfection of vessels, churns, etc., should suffice to guarantee the absence of living pathogenic bacteria in skim milk intended for animal feeding.—M. Landau.

—. (1941). **Meat for Millions. Report of the New York State Trichinosis Commission.**—*New York State Legislative Document* (*1941*). No. 52. pp. 282.

The New York State Trichinosis Commission was set up in 1940 to study trichinosis and other diseases contracted by eating infected meat. The Commission has compiled a large amount of data, has conducted skin tests in hogs, and has instituted propaganda to instruct the public in the dangers of trichinosis and the necessity for prevention by thorough cooking of pork products. In part I of the report the Commission details its recommendations which are based on the evidence presented in part II. Part II opens with two very readable popular articles on trichinosis intended for instruction of the public, and a technical article. Other sections deal with the prevalence of trichinosis, relationship of garbage to trichinosis, control through microscopic inspection, control by skin testing of swine, pork products, control by education, licensing of abattoirs, and meat inspection. There is also a section on tularaemia.

Examination of nearly 5,000 human cadavers by the U.S. Public Health Service has suggested that one person in six in the U.S.A. is infected with trichinae. Incidence tends to increase with age. (Examinations were made by direct microscopic examination of diaphragm muscle and supplemented by a digestion-Baermann technique for detecting live larvae.) The average annual number of reported clinical cases in New York State from 1931–1936 was over ten per million head of population. Great use is made of these facts in educational propaganda. Trichinosis is regarded as a "major public health problem". The Commission recommends the adoption of legislation to prevent feeding of uncooked garbage and abattoir offal to swine, to require the processing of intra- as well as inter-state pork products, and to prohibit the mixing of pork in "hamburgers". It is pointed out that Canada, where cooking of garbage fed to hogs has been compulsory since 1915, is today virtually free from trichinosis. Existing Federal legislation requiring the processing of pork products to destroy trichinae does not apply to products made and sold within any one state, nor does it apply to pork products customarily cooked by the consumer. Regulations prescribe treatment by heat so that all parts of the product reach a temperature of 137°F., by refrigeration, or by various methods of curing. Microscopic inspection is not a fully efficient method; its introduction on a nation-wide scale would be too costly and very difficult to apply uniformly in every state. Its general use might engender a false sense of security in the public mind and encourage consumption of raw pork.

Meat inspection generally is reviewed and it is recommended that the Commission be continued so that a detailed study of the situation may be made.

The Commission considered desirable the development of an effective skin test for hogs; skin testing had given encouraging results but more work was required. Apart from specificity the test must be rapid both in application and reading of results. Amongst miscellaneous recommendations is a proposal to establish an informal interdepartmental committee to co-ordinate the work of the State Health Department and the State Department of Agriculture and Markets in the field of trichinosis. The institution of educational campaigns for housewives, for hog raisers, and for doctors is also urged.

The section dealing with tularaemia records 2,200 cases of this disease reported in the U.S.A. in 1939 with 150 deaths. In New York City, rabbits skinned, eviscerated, washed, and wrapped at the point of origin

and shipped in boxes are sold without inspection, but unskinned non-eviscerated rabbits are subject to inspection at a central station on arrival. The chief danger from tularaemia is in the handling and dressing of carcasses of game, particularly wild rabbits.
—H. E. HARBOUR.

BARTEL, H. (1941). Wie entstehen die menschlichen Gesundheitsschädigungen bei Aufnahme von Enteritisbacterien? [**Pathogenesis of Salmonella Food Poisoning in Man**].—*Tierärztl. Rdsch.* **47.** 302–305.
B. discusses the pathogenesis of food poisoning by salmonella. No new evidence is provided.—M. LANDAU.

TECHNIQUE AND APPARATUS

*CHRISTOFFERSEN, P. A., OTTOSEN, H. E., & GRÖNLUND-THOMSEN, K. (1941). [**Fluorescence Microscopical Demonstration of Acid-Fast Bacteria**].—*Maanedsskr. Dyrlaeg.* **52.** 429–448. [Abst. from abst. in *Tierärztl. Rdsch.* **47.** 376].
This is largely a discussion on technicalities of the various apparatus used. In a comparative test of fluorescence microscopy and Ziehl-Neelsen's staining method with 1,525 milk samples, 692 uterine mucus samples, 242 lung mucus samples, 150 lymph node samples, and 1,465 cervical lymph nodes from swine, the former test detected more positive cases. Apparently some samples were positive on fluorescence microscopy and negative on g. pig inoculation; this is considered by the authors to indicate the possibility of the existence of false positive results.

SCHÖNBERG, F. (1940). Gramsche Färbung ohne Jod-jodkaliumlösung. [**Gram Staining without Iodine-Potassium-Iodide Solution**].—*Dtsch. tierärztl. Wschr.* **40.** 221.
S. states that iodine in the Gram staining method can be replaced by 10% aqueous picric acid.—J. E.

ROE, M. A., WILCOX, A., & LILLIE, R. D. (1941). **Eosinates of the Azures and Methylene Blue in Preparation of a Satisfactory Giemsa Stain from Dyes of American Manufacture.**—*Publ. Hlth Rep., Wash.* **56.** 1906–1909.
Uniformity in staining is essential and it has been observed that great variation occurs when formulae are compounded by dissolving dye mixtures in glycerin methyl alcohol. As the eosinates of azure B, azure A, and methylene blue are of apparently constant composition and are simply prepared, the variations were minimized by employing a formula including these rather than the thiazin dyes. The amended formula for Giemsa stain is tabulated as follows :– azure A eosinate, 50 mg.; azure B eosinate, 250 mg.; methylene blue eosinate, 200 mg.; methylene blue chloride (88%), 100 mg., although 50–75 mg. is probably sufficient; glycerin, 50 ml., methyl alcohol, 50 ml. Freshly made solution, at the end of 2–3 days, gave good uniform results. Examples of staining include blood films, malaria parasites, demonstration of Schüffner dots of tertian malaria, young rings of aestivo-autumnal malaria parasites, and the undulating membrane and kinetoplastic, nuclear, and cytoplasmic bodies of *Trypanosoma equiperdum*.—C. HORTON SMITH.

*VAN OIJEN, C. F. (1940). Eenige onderzoekingen omtrent de bacterie-doodende werking der "Westinghouse-Sterilamp". [**Sterilizing Action of the Westinghouse "Sterilamp"**].—*Tijdschr. Diergeneesk.* **67.** 586–596. [Translation of abst. in *Zbl. Bakt. I.* (*Ref.*). **139.** 48].
Cultures of *Bacterium coli*, *Salmonella typhi-murium*, and an undetermined species of *Micrococcus*, on the surface of thin agar plates or surrounded by the medium, were to a great extent killed by irradiation with the Westinghouse "sterilamp" [which emits ultra-violet rays extending over a narrow spectral band at about 2537 Å]. The effect of the irradiation was dependent on its duration, on temperature, and on the distance between lamp and culture.

EMMEL, M. W. (1941). **The Ventilation Problem in Indoor Battery Plants.**—*J. Amer. vet. med. Ass.* **99.** 232–234.
E. considers that the high mortality which occurs in indoor hen battery plants is in the main associated with adverse atmospheric conditions, and in particular inadequate ventilation. He suggests that there is a definite biological saturation point for every hen battery, and that where crowding exceeds this point, manifestations occur.
The factors controlling adverse atmospheric conditions, and those favouring efficient and adequate ventilation are briefly discussed. It is stated that birds raised under adverse atmospheric conditions were more susceptible to all types of experimental procedures used for inducing fowl paralysis, leucaemia, and allied conditions.—R. F. GORDON.

*GAVRILOV, W., LESNERET, S., & COWEZ, S. (1940). Emploi de la méthode des cultures de tissus dans l'étude des protozoaires. Les trypanosomes. [**Tissue Culture for Protozoa. Trypanosomes**].—*Riv. Parassit.* **4.** 147–154. [Abst. from abst. in *Zbl. Bakt. I.* (*Ref.*). **139.** 410].
Hanging-drop cultures are set up of rat organ tissues with added rat plasma and embryo extract. Three days later the cultures are infected with trypanosomes by the introduction of infected rabbit serum. *T. cruzi* multiplies in the histiocytes and fibroblasts; the paper includes three photomicrographs of infected cells. After 1–2 days the trypanosomes disappear, but the leishmanial form persists longer. *T. brucei* and *T. rhodesiense* survive 5–6 days.

MISCELLANEOUS

—. (1942). **Colonial Office. Agriculture in the West Indies. Compiled from Documents supplied to the West India Royal Commission, 1938–1939, and other Sources.** pp. vi + 280. London: H.M. Stat. Off. [8vo] [10s.]
A general account of agriculture in the West Indies, giving details of each individual administration. There is occasional reference to animal diseases in certain territories.

KAURA, R. L. (1941). **Some Common Breeds of Indian Sheep.**—*Indian Fmg.* **2.** 175–179.
K. gives the geographical distribution, characteristics, and economic importance of seven common Indian breeds of sheep, *viz*, Bikaneri, Lohi, Billary, Deccani, Balkhi, Hashtnagri, and Nellori. A broad basis for classification of these breeds and a table of their measurements and wool production are also given.—T. AHMAD.

BOURDILLON, R. B., LIDWELL, O. M., & LOVELOCK, J. E. (1942). **Sneezing, and Disinfection by Hypochlorites.**—*Brit. med. J.* Jan. 10th. 42–44. [Authors' summary copied *verbatim*].
Tests in a closed room have shown that an average vigorous sneeze causes the emission of about 100,000 bacteria-carrying particles of a size small enough to

remain in the air for more than one minute. Of these about 4% will usually remain suspended in still air for as long as thirty minutes.

All or almost all the bacteria thus emitted can be killed in three to four minutes by a spray of 1% sodium hypochlorite solution in a concentration of 2·1 c.cm. per 1,000 c.ft. of air.

Certain unfavourable conditions exist, such as low relative humidity or high content of organic matter in the air, which may hinder the action of hypochlorite sprays.

I. —. (1940). Die Beurteilung des elektrischen Treibstockes unter dem Gesichtspunkt des Tierschutzes. **[The Electric Goad from the Viewpoint of the Protection of Animals against Cruelty].**—*Berl. Münch. tierärztl. Wschr.* Nov. 1st. 529.

II. STEDEFEDER. (1940). Zum Tierschutz. **[Protection of Animals against Cruelty].**—*Ibid.* 529–530.

III. ZERNECKE. (1940). Bedeutet die Anwendung des elektrischen Treibstockes eine Tierquälerei ? **[Is the Use of the Electric Goad Cruel to Animals ?]**—*Ibid.* 530.

IV. KETZ. (1940). Zur Beurteilung des elektrischen Treibstockes vom Standpunkt des Reichstierschutzgesetzes. **[The Electric Goad from the Standpoint of the Reich Animal Protection Law].**—*Ibid.* 530–533.

I. An introduction to II–IV.

II. S. has pointed out in a previous publication that the use of electric goads on swine can result in pain, lameness, and stiffness ; it is not surprising, therefore, that their use on other species can produce similar conditions. He remarks that stimuli, electric or otherwise, are very effective when applied in the region of the undersurface of tail, owing to the special sensitivity of this area. He considers that the use of electric goads should be forbidden to laymen, and that their application even by veterinary surgeons should be severely restricted.

III. Z. believes that the use of the electric goad at abattoirs, markets, and on race courses makes a better impression on the onlookers than the cruder methods of beating, etc. Taking into account the difficulty in assessing animal suffering, and the differences of individual reactions to the goad, he considers that, judging by available data, total prohibition is unnecessary but that the use of electric goads should be strictly supervised in all cases, and that they should not be applied to debilitated cattle.

IV. K. after self-experiments based on the assumption that the reactions of human beings to the stimulus of the goad will not markedly differ from those of animals, and after comparison of P.M. pathological changes caused by various methods of driving animals, concludes that, as under present conditions some type of force is inevitable, the intelligent, restricted application of electric goads to healthy animals does not contravene the Reich Animal Protection Law, but that its use on lame or sick animals warrants prohibition.—O. D. J.

JORDAN, P. (1939). Statistische Analyse biologischer Elementärreaktionen. **[Statistical Analysis of Fundamental Biological Reactions].**—*Arch. ges. Virusforsch.* **1.** 171–214.

The views and problems discussed in the paper entitled " The Place of the Quantum Theory in the Problems of Biology " [*V. B.* **11.** 568.] are further discussed. The original should be consulted by those interested in the subject as the paper does not lend itself to effective abstracting. An extensive bibliography of 81 references is given.

OFFICIAL AND OTHER REPORTS

UNITED STATES OF AMERICA : NEVADA. (1940). **[Report of] Division of Animal Industry [State Department of Agriculture, 1938-40].** [EARL, W. B.]—*Bienn. Rep. Nev. Dep. Agric., 1938–40.* pp. 11–23.

ANIMAL DISEASES. A severe outbreak of ANTHRAX occurred in 1939 owing to laxity in immunizing stock in a known anthrax area. Nevada continued to be a modified accredited area for BOVINE TUBERCULOSIS control ; 51 reactors were found during the period. The control of BOVINE BRUCELLOSIS was delayed because of the lack of a firm state policy, although much private testing was done. BACILLARY HAEMOGLOBINURIA remained as an important local disease ; the existing vaccines confer immunity for a short period only. SWINE FEVER losses were slight. Some statistical information is given on these matters.—J. E.

UNITED STATES OF AMERICA : MONTANA. (1940). **Report of the Montana Livestock Sanitary Board, December 1st, 1939, to November 30th, 1940.** [BUTLER, W. J.] pp. 28. [4to] [Mimeographed].

Horse diseases of note included ENCEPHALOMYELITIS, of which 90 cases occurred, and INFECTIOUS ANAEMIA, which was limited to two districts. Pectoral muscle abscesses due to *Corynebacterium* infection were often seen. In cattle, one outbreak of ANTHRAX occurred. TUBERCULOSIS was extremely rare (16 reactors in 35,250 cattle tested). In the Federal scheme 40,300 cattle were tested for BRUCELLOSIS and just under 4% reacted. BACILLARY ICTEROHAEMOGLOBINURIA was diagnosed for the first time. KERATITIS or PINK EYE was common. *Stephanofilaria stilesi* was found in skin lesions of the umbilical region of cattle. A noteworthy finding in sheep was JOHNE'S DISEASE, evidently for the second time only in the U.S.A. There were no serious pig disease outbreaks. SWINE FEVER occurred in 44 premises ; ERYSIPELAS and TRICHINOSIS were not seen. There were no cases of RABIES in any animal. Diagnostic work and chemical analyses of animal and foodstuff materials are summarized in tables.—J. E.

BOOK REVIEW

MUIR, R. (M.A., M.D., ScD., LL.D., F.R.S., Emeritus Professor of Pathology, University of Glasgow, Honorary Pathologist to the Western Infirmary, Glasgow]. (1941). **Text-Book of Pathology.** pp. vii+991. 599 figs. London : Edward Arnold & Co. [8vo] [35s.]

In its fifth edition, this book retains its place as one of the most popular text-books of human pathology. In addition to its value for medical students it serves as an admirable introduction to general pathology for the veterinary student. The principles of pathology are the same in all higher animals and the veterinary student will scarcely find them more clearly explained than in this book.

There has been some rearrangement and certain portions have been rewritten so as to incorporate recent advances in knowledge. A number of new illustrations have been added, but there is no departure from black and white : had it not been for the war it might well have been possible to include some illustrations in natural colour which would have enhanced still further the value of the book.—E. G. WHITE.

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